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December 15, 2005

Dear Friends of the Chicopee River Watershed:

It is with great pleasure that I present you with the 5-Year Watershed Action Plan for the Chicopee River Watershed. The plan will be used to guide local and state environmental efforts within the Chicopee River Watershed over the next five years. The plan expresses some of the overall goals of the Executive Office of Environmental Affairs, such as improving water quality, restoring natural flows to rivers, protecting and restoring biodiversity and habitats, improving public access and balanced resource use, improving local capacity, and promoting a shared responsibility for watershed protection and management.

The Chicopee River Watershed Action Plan was developed with input from a steering committee including the former Chicopee River Watershed Team and multiple stakeholders including watershed groups, state and federal agencies, municipal officials, Regional Planning Agencies and, of course, the general public from across the Watershed. We appreciate the opportunity to engage such a wide group of expertise and experience as it allows the state to focus on the issues and challenges that might otherwise not be easily characterized. From your input we have identified the following priorities that apply to all the subwatersheds:

- Protect and Improve Water Quality
- Protect Aquatic Resources and Freshwater Biodiversity
- Increase Environmental Knowledge and Access to Environmental Resources
- Build Stakeholder Capacity
- Enhance Recreational Opportunities

I commend everyone involved in this endeavor. Thank you for your dedication and expertise. If you are not currently a participant, I strongly encourage you to become active in the Chicopee River Watershed's restoration and protection efforts.

Sincerely,

A handwritten signature in black ink that reads "Stephen R. Pritchard".

Stephen R. Pritchard
Secretary

**Chicopee River Basin
Five-Year Watershed Action Plan**

2005-2010



(Photo Credit: MDEP)

June 2005

The Commonwealth of Massachusetts
Executive Office of Environmental Affairs

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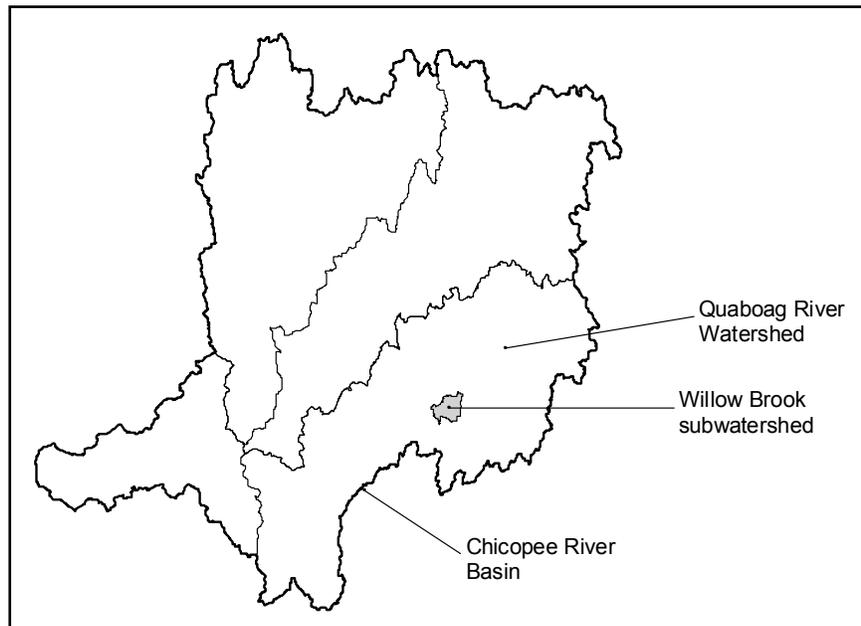
List of Acronyms and Common Terminology

BMP	Best Management Practice
COLAP	Massachusetts Congress of Lake and Pond Associations, Inc.
CMRPC	Central Massachusetts Regional Planning Commission
CSOs	Combined Sewer Overflows
DPW	Department of Public Works
EOEA	Massachusetts Executive Office of Environmental Affairs
EPA	Environmental Protection Agency
ESS	Environmental Science Services, Inc.
FERC	Federal Energy Regulatory Commission
FRCOG	Franklin Regional Council of Governments
IPANE	Invasive Plant Atlas of New England
LGEAN	Local Government Environmental Assistance Network
MBOH	Massachusetts Board of Health
MDAR	Massachusetts Department of Agriculture
MDC	Metropolitan District Commission
MDCR	Massachusetts Department of Conservation and Recreation
MDEM	Massachusetts Department of Environmental Management
MDEM	Massachusetts Department of Environmental Management
MDEP	Massachusetts Department of Environmental Protection
MDFW	Massachusetts Division of Fish and Wildlife
MDHCD	Massachusetts Department of Housing and Community Development
MDMF	Massachusetts Division of Marine Fisheries
MDOE	Massachusetts Department of Education
MEP	Massachusetts Environmental Police
MGD	Million Gallons of water per Day
MHD	Massachusetts Highway Department
MHFA	Massachusetts Housing and Finance Agency
mi ²	Square Miles
MRPA	Massachusetts Recreation and Parks Association
MRPC	Massachusetts Regional Planning Commission
MWI	Massachusetts Watershed Initiative
MWC	Massachusetts Watershed Coalition
MWRA	Massachusetts Water Resource Authority
NHESP	Natural Heritage and Endangered Species Program
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollution Discharge Elimination System
NRCS	National Resources Conservation Service
PAB	Massachusetts Department of Fish and Game Public Access Board
PALIS	Pond and Lake Information System
PVPC	Pioneer Valley Planning Commission
SMART	Strategic Monitoring and Assessment for River basin Teams
TMDL	Total Maximum Daily Load (e.g., Pollution Budget)
TNC	The Nature Conservancy
TU	Trout Unlimited
USFWS	U.S. Fish and Wildlife Service
WAP	Watershed Action Plan
WMA	Water Management Plan
WPI	Worcester Polytechnic Institute
WWTP	Waste Water Treatment Plant

Terminology

Throughout this report the following terms and their meanings are used to represent drainage areas of different magnitude:

- Basin Refers to the entire Chicopee River drainage area (721 mi²)
- Watershed Usually refers to the drainage area of the four major watersheds within the Chicopee River basin (e.g., Chicopee River, Swift River, Ware River, and Quaboag River)
- Sub-watershed Usually refers to the drainage areas of the main tributaries to the major rivers. There are a total of 44.



Source: ([EOEA, 2003](#))

GIS Layers:

The GIS layers used to develop the thematic maps in this report were obtained from the Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs unless otherwise noted.

1.0 INTRODUCTION

The purpose of this section is to describe the process used to develop the first 5 Year Watershed Action Plan (WAP) for the Chicopee River basin, as well as provide an overview of the project study area.

1.1 Background

The following WAP was developed for the Chicopee River basin (Basin). It will serve as the strategic plan for the Massachusetts Executive Office of Environmental Affairs (EOEA) for calendar years 2005-2010.

This WAP represents a broad approach to watershed management, and is the result of an extensive outreach and planning process designed to bring forth priority issues for the preservation, protection and restoration of water related resources.

This WAP aims to prioritize which projects are likely to receive state and federal grants and loans, regulatory decision-making, and educational/technical assistance programs to solve the most important environmental problems affecting communities within the Basin. In addition to describing goals, objectives and a long-term vision for the Basin, the WAP recommends numerous priority actions for the next five years. An action plan matrix displays the relative priority of each action, potential sources of funding, as well as potential partners for reaching the five-year goals. The actions are structured according to five overarching goals (see below) for the Chicopee River basin, each of which includes several smaller objectives and actions.

1.2 Vision Statement

This Chicopee River basin is the largest of the 27 major basins used for planning purposes in the Commonwealth of Massachusetts. It contains a diversity of stakeholders with variable interests in watershed planning and water related activities. These individuals are working together to identify priority issues that will preserve and improve the integrity of the Basin's environmental, land, recreation, and other important resources. By continuing to evaluate the Basin's needs and by implementing priority actions, measurable improvements in environmental knowledge, water quality, stakeholder capacity, and aquatic and biological resources will be made.

Five overarching goals (listed below) were identified as part of the development of the WAP that, when undertaken as specific priority actions, will help direct efforts to protect and improve the environmental quality of the Chicopee River basin.

- Protect and Improve Water Quality
- Protect Aquatic Resources and Freshwater Biodiversity
- Increase Environmental Knowledge and Access to Environmental Resources
- Build Stakeholder Capacity
- Enhance Recreational Opportunities

1.3 Development Process

The EOEA ([2003](#)) report entitled, "Chicopee River – A Comprehensive Watershed Assessment 2003" (Assessment Report) served as the basis for developing the WAP. It was published in 2003 under the former Massachusetts Watershed Initiative (MWI) and represents the first and most recent comprehensive watershed assessment of the Basin. The Assessment Report provided a thorough description of the Basin by summarizing the known physical, ecological, and social information as well as providing an assessment of this information.

The planning process for developing the WAP began with the creation of a stakeholder database that included parties having an interest in the Chicopee River basin and in the development of the WAP. For those towns that were 75-100% contained within the Basin, contact was made with the individual planning boards and conservation commissions. Similarly, other potentially interested stakeholders including land conservation organizations, numerous federal/state agencies, sportsmen associations, all registered/permitted water users, and several other entities were contacted. Collectively, approximately 150 (the full list is provided in [Appendix A](#)) individuals or organizations were contacted by telephone as well as by direct mailing. An introductory letter was transmitted outlining the purpose and importance of developing the WAP. The letter also requested that parties indicate their desired level of participation in developing the WAP including serving on a steering committee, being advised through correspondence, or having no interest. E-mail addresses were also obtained for the stakeholders, which served as the primary means of corresponding with interested parties.

Following this outreach effort, a steering committee was developed consisting of a variety of interested stakeholders and agencies active in the Chicopee River basin (see [Appendix B](#) for steering committee members). The role of the steering committee was to provide overall direction and vision for this effort. Steering committee members provided reports and studies undertaken or completed since the Assessment Report was completed in 2003. These reports were reviewed to identify potential priority actions to supplement those already identified in the Assessment Report. Collectively, the steering committee met on three occasions to help provide input, prioritize actions, and to review and comment on the Draft WAP.

In addition to the steering committee meetings, public meetings were held in the watershed to further identify priority issues and concerns. These efforts included two public forums held on the evening of July 26th and 27th with various stakeholders. Attendees included representatives from the Chicopee Watershed Council, Lake Wickaboag Preservation Association, West Brookfield Board of Health, Monson Conservation Commission, Connecticut River Watershed Council, MassWildlife, and concerned citizens. The public meetings were advertised in local papers, and the contacts stored in our database were contacted via e-mailed or direct mailing to broadcast the agenda and meeting dates and locations.

A series of goals and objectives were identified through review of the Assessment Report and recent environmental studies as well as through correspondence with members of the steering committee. Organization of these goals and the identification of priority issues were conducted through the outreach process. The WAP was then developed to bring forth priority actions that can be implemented within the Basin during the next five years to accomplish the priority goals and objectives.

The WAP builds upon other planning efforts undertaken by concerned citizens, as well as those conducted by other local, state, and federal agencies. Priority actions listed in this document are not limited to projects best suited for government action. Several actions were identified that could be undertaken by a variety of stakeholders within the Basin.

1.4 Overview of the Chicopee River Basin

The Chicopee River basin (Basin) is located in the heart of Massachusetts, and it encompasses all or part of 39 cities and towns in four counties ([Figure 1.4-1](#)). It is the largest of the 27 major basins delineated for planning purposes in the state and contains a total of 136 named streams and 174 lakes, ponds and impoundments. It has a total drainage area of 721 mi² and is comprised of four major watersheds: Swift River watershed (215 mi²), Ware River watershed (218 mi²), Quaboag River watershed (212 mi²), and Chicopee River watershed (76 mi²). These major watersheds are in turn comprised of 44 sub-watersheds. The Basin is bordered by the Connecticut, Miller's, Nashua, Blackstone, French, and Quinebaug River basins. ([EOEA, 2003](#))

1.4.1 Land Use

The Basin is largely undeveloped and predominately covered by a forest landscape, except for the major Springfield-Chicopee urban areas located in the southwest portion of the Basin and the smaller developed areas that are scattered throughout the area ([Figure 1.4.1-1](#)). According to the most recent land use summary statistics (developed in 1999), 68.9 % of the Basin is forested, 8.7 % is residential, 7.2 % is agricultural, 7.1 % is covered by water, 3.8 % is open land, 2.3 % is wetland, 1.4 % is commercial or industrial and 0.7 % is used for transportation ([EOEA, 2003](#)).

1.4.2 Major Rivers

A description of the four major rivers and their watersheds, is summarized below and further in [Table 1.4.2-1](#). The location of USGS real-time streamflow gages and their corresponding flow statistics are shown in [Figure 1.4.2-1](#).

Swift River - The Swift River originates in the northwest portion of the Basin and joins the Ware River in Palmer, MA. It has a total drainage area of approximately 215 mi², which is largely controlled by Winsor Dam and Goodnough Dike located at the southernmost portion of the Quabbin Reservoir. The Massachusetts Water Resource Authority (MWRA) controls the releases from the Quabbin Reservoir to ensure a high quality adequate water supply for its customers, to maintain adequate flood protection, and to meet minimum flow requirements for the Swift River. Water is predominately discharged from the reservoir through the Quabbin Aqueduct to the Wachusett Reservoir, which is located in the Nashua River basin. From there it supplies drinking water to the greater Boston area. However, a smaller proportion is also discharged through the Chicopee Valley Aqueduct to the Connecticut River basin through the communities of Chicopee, South Hadley, and Wilbraham ([MWRA, 2002](#)). Water diversions for the Quabbin Reservoir have resulted in significantly altered streamflows in the Swift River below the Quabbin Reservoir since 1939, when the dam and dike were constructed. However, the relatively constant release of cool clear water to the Swift River to meet flow requirements provides beneficial impacts to the local cold water fishery ([EOEA 2003](#)).

Ware River - The headwaters of the Ware River originate in the northeast portion of the Basin and its watershed drains approximately 218 mi² before joining the Quabog River in Palmer, MA. The MWRA operates a diversion facility in Barre that diverts water into the Quabbin Reservoir to increase the reservoir's safe yield. These diversions are limited to a period when the flow in the Ware River exceeds 85 million gallons of water per day (MGD) and are subject to permission from the Massachusetts Department of Environmental Protection (MDEP) during the period from June 1 to June 15 and October 15 to November 30 ([MWRA, 2002](#)). Overall, the impact of water withdrawals is not as pronounced on the streamflow of the Ware River as it is on the Swift River.

Quaboag River - The Quaboag River watershed is located in the southern portion of the Basin. The Quaboag River originates in the towns of Rutland and Paxton, MA and drains an area of approximately 212 mi² before joining the Ware River. This watershed is not affected by major water diversions described earlier and has maintained a relatively consistent streamflow since the early 1900's ([EOEA, 2003](#)). According to MDEP's Pond and Lake Information System (PALIS), the Quaboag watershed contains 66 lakes and ponds ([MassGIS, 2005a](#)). Some of these lakes and ponds are listed on the 2004 303(d) list of waters that are impaired and require the calculation of a Total Maximum Daily Load (TMDL) (see [Table 2.1.1-1](#)). The causes of impairment for these lakes include turbidity, noxious plants, exotic species, metals, and organic enrichment/low dissolved oxygen ([MDEP, 2004](#)).

Chicopee River - The Chicopee River originates in the village of Three Rivers (Palmer, MA) at the confluence of the Ware and Quaboag Rivers and is the largest tributary to the Connecticut River. It has total drainage area of 76 mi², which is the smallest of the four major watersheds within the Basin. The Chicopee River flows 18 miles from its origin before joining the Connecticut River in the City of Chicopee, MA ([EOEA 2003](#)).

Table 1.4.2-1. Characteristics of the four major river systems in the Chicopee River basin.
(Source: [EOEA, 2003](#))

River System	Drainage Area	Communities
Swift River	215 mi ²	Barre, Belchertown, Hardwick, New Salem, Orange, Pelham, Petersham, Phillipston, Shutesbury, Ware, Wendell
Ware River	218 mi ²	Barre, Hardwick, Hubbardston, New Braintree, Oakham, Palmer, Petersham, Phillipston, Princeton, Rutland, Templeton, Ware, Warren, West Brookfield, Westminster
Quaboag River	212 mi ²	Brookfield, Brimfield, Charlton, E. Brookfield, Leicester, Monson, New Braintree, N. Brookfield, Oakham, Palmer, Paxton, Rutland, Spencer, Sturbridge, Wales, Ware, Warren, W. Brookfield
Chicopee River	76 mi ²	Belchertown, Chicopee, Granby, Hampden, Ludlow, Monson, Palmer, Springfield, Wilbraham

1.4.3 Infrastructure

The Chicopee River basin contains numerous public water supplies, nine wastewater treatment plants, numerous dams, six active landfills, as well as several miles of roads and railroads ([EOEA, 2003](#)).

Of the total public water supplies ([Figure 1.4.3-1](#)), eleven are surface water reservoirs, seven of which are active surface water supplies. The largest of these supplies is the 25,000 acre Quabbin Reservoir, which is one of the largest reservoirs constructed for public water supply in the world. The Quabbin Reservoir was formed by impounding the Swift River during the construction of the Winsor Dam and Goodnough Dike during the 1930s. It is the primary water supply source for most of the cities and towns near Boston and the combined Quabbin/Ware River system supplies drinking water to almost half of the population of the Commonwealth of Massachusetts. Overall, the combined watershed area of the surface water supplies within the Chicopee River basin is approximately 307 mi², which is approximately 43 % of the Basin's total area ([EOEA, 2003](#)).

The Basin also contains a number of municipal and industrial facilities that discharge to the Swift, Ware, Quaboag, and Chicopee rivers, which require National Pollution Discharge and Elimination System (NPDES) Permits ([Figure 1.4.3-2](#)). MDEP ([2001](#)) identified the following types of NPDES discharges that occur within the Basin:

- Municipal wastewater treatment plants;
- Combined sewer overflows;
- Industrial wastewater treatment plants and non-process discharges;
- Hydroelectric power plants;
- Other power plants.

Numerous dams are located throughout the Basin as shown in [Figure 1.4.3-3](#). The U.S. Fish and Wildlife Service (USFWS) lists 111 dams within the Basin that are considered barriers to fish movement. Many of these dams are small and impound little water. However, the larger dams that are associated with public water supplies and hydroelectric facilities (e.g., 11 Federal Energy Regulatory Commission [FERC] regulated dams) can have substantial influences on local flow conditions ([EOEA, 2003](#)).

Figure 1.4-1. Chicopee River Basin

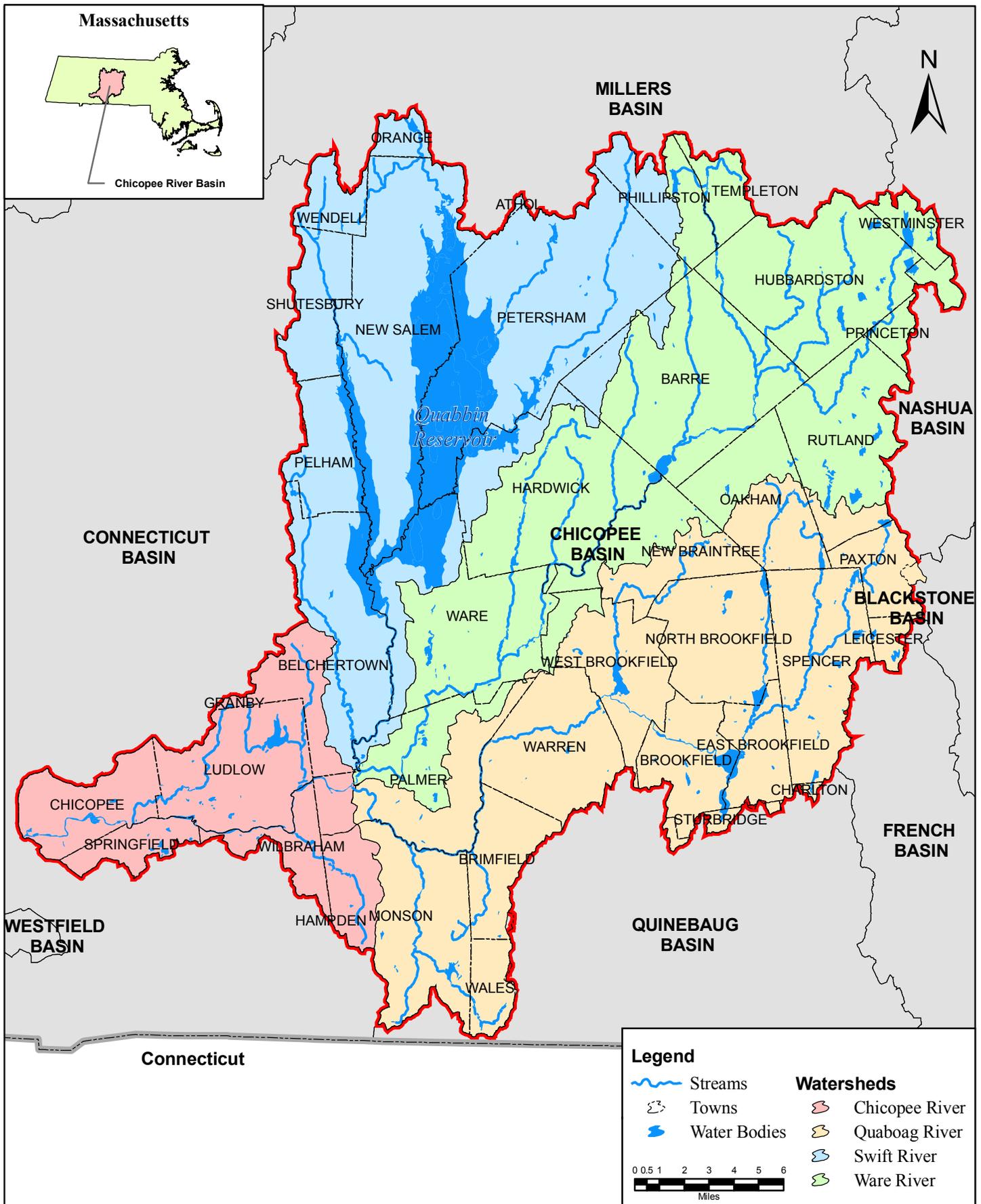


Figure 1.4.1-1. 1999 Land Use Classification within the Chicopee River Basin

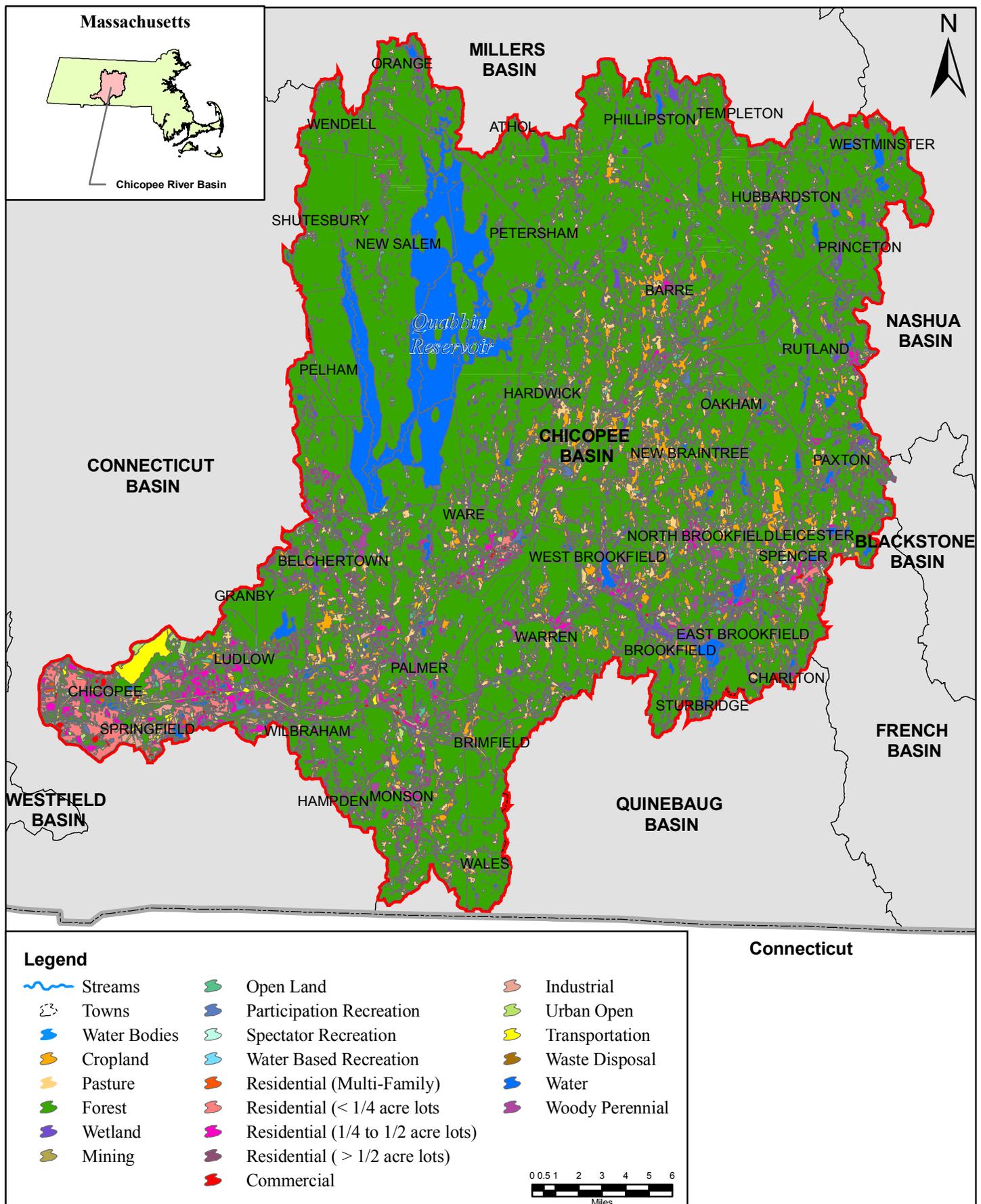
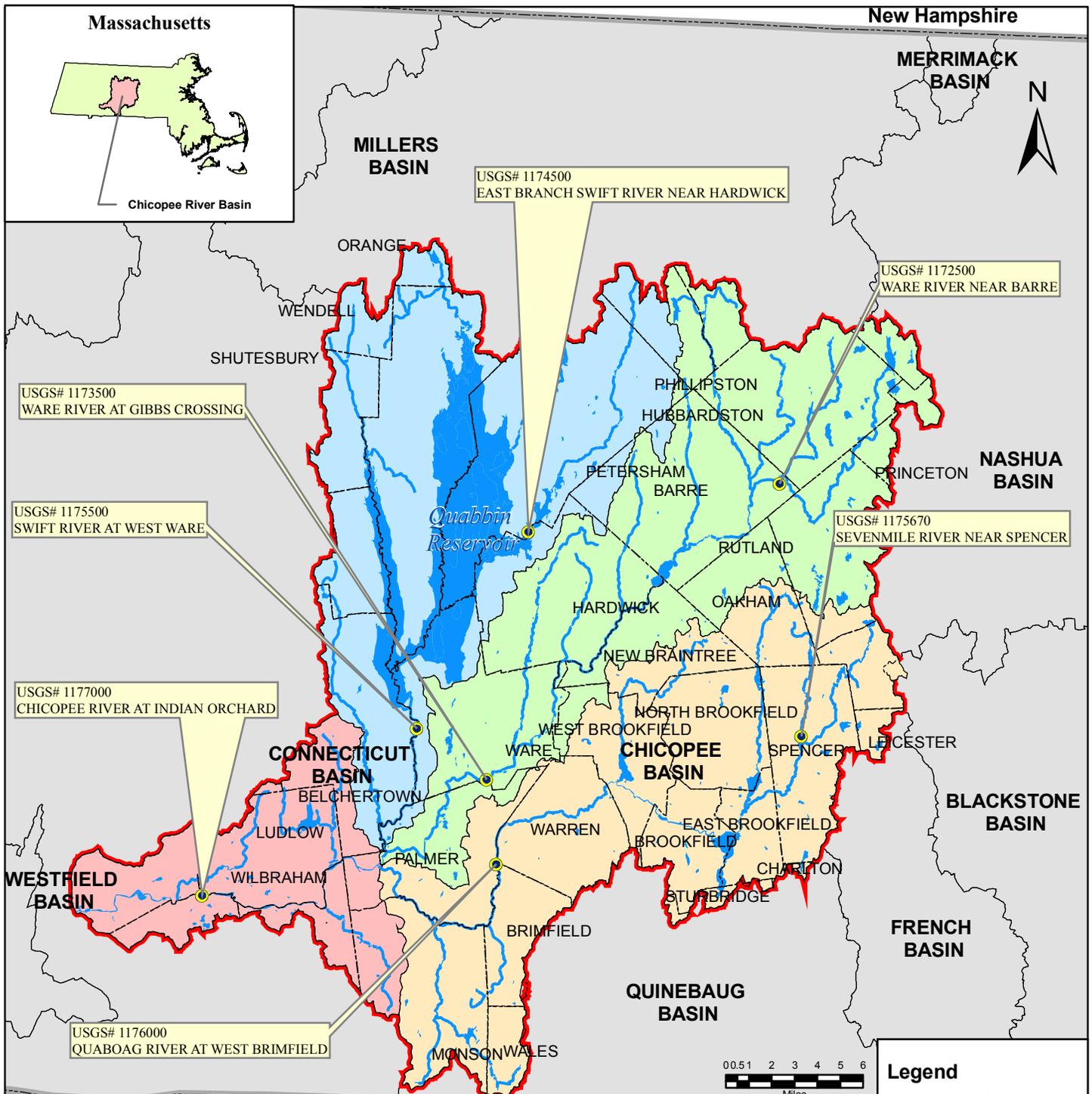


Figure 1.4.2-1. Location of Real-time USGS Gages within the Chicopee River Basin and their Corresponding Summary Statistics.



Daily mean flow summary statistics for the seven USGS gages located within the Chicopee River basin. Please note, the percent exceedance calculations represent annual exceedance values and the 7Q10 values were calculated in 1984. (GIS Layer and statistic source: USGS)

Gage ID	Drainage (mi ²)	Minimum (cfs)	Mean (cfs)	Maximum (cfs)	80 % Exceedance (cfs)	50 % Exceedance (cfs)	20 % Exceedance (cfs)	7Q10 (cfs)	Period of Record (years)
1172500	55.1	5.3	67.2	429	17.6	38.5	109	1.3	58
1173500	197	16	238	878	89.6	162	359	22	92
1174500	43.7	3.5	45.1	175	18	33	76.4	0.12	68
1175500	189	28	154	860	39	89	230	33.7	92
1175670	8.81	95	9.45	37	2.9	5.25	16	0.22	44
1176000	150	24	174	706	65	106	279	13.2	92
1177000	689	180	724	2,690	345	581	1,116	128	76

Legend

- USGS Gages
- Streams
- Towns
- Water Bodies

Watersheds

- Chicopee River
- Quaboag River
- Swift River
- Ware River

Figure 1.4.3-1. Public Water Supplies within the Chicopee River Basin.

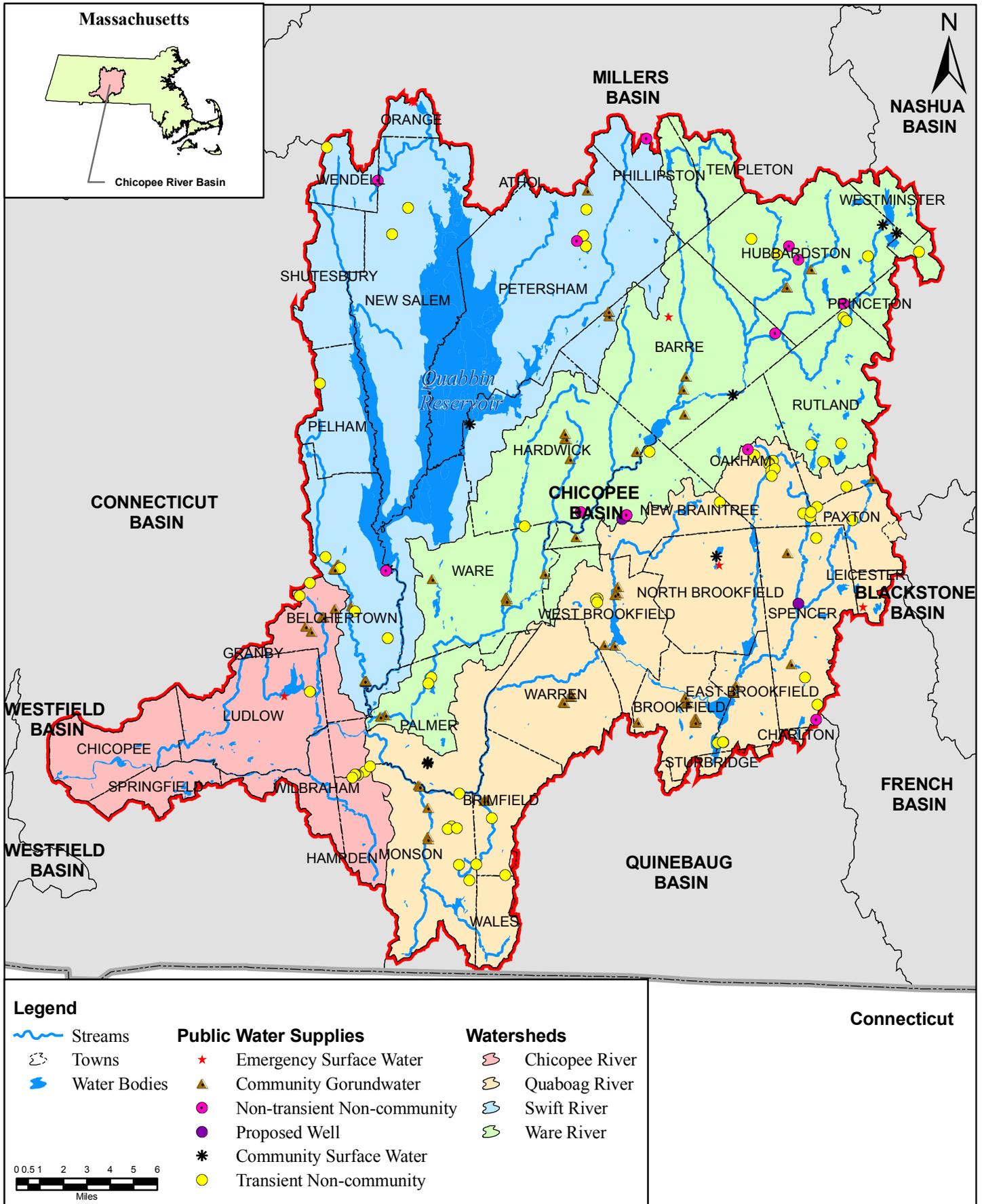
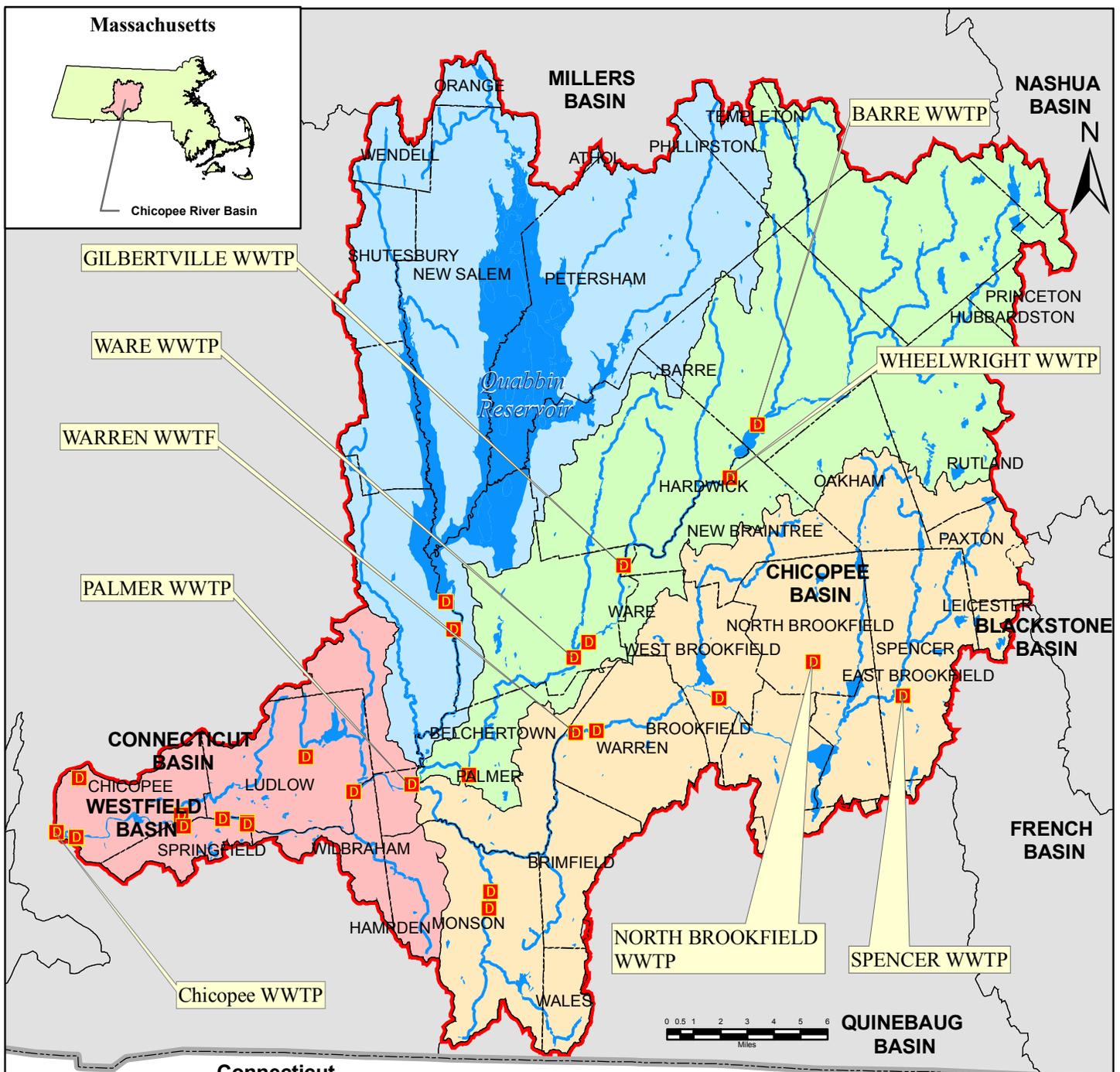


Figure 1.4.3-2. Location of NPDES Permits within the Chicopee River Basin



Characteristics of the wastewater treatment plants within the Chicopee River basin.
 Source: NPDES GIS layer provided by MDEP; Table modified from Table 16 in EOA (2003).

Facility	Permit Number	Receiving Water Body	Mean Monthly Flow MGD (cfs)	Designed Flow MGD (cfs)	Town(s) served
Barre WWTP	MA0103152	Ware River	0.21 (0.32)	0.3 (0.46)	Barre
Chicopee WWTP	MA0101508	Chicopee & Connecticut Rivers	9.8 (15.16)	15.5 (23.98)	Chicopee
Gilbertville WWTP	MA0100102	Ware River	0.14 (0.22)	0.23 (0.36)	Hardwick
North Brookfield WWTP	MA0101061	Dunn Brook	0.47 (0.73)	0.76 (1.18)	N. Brookfield
Palmer WWTP	MA0101168	Chicopee River	2.26 (3.50)	5.6 (8.66)	Palmer, Monson
Spencer	MA0100919	Cranberry Brook	0.67 (1.04)	1.08 (1.67)	Spencer
Ware WWTP	MA0100889	Ware River	0.72 (1.11)	1.0 (1.55)	Ware
Warren WWTP	MA0101567	Quaboag River	0.67 (1.04)	1.5 (2.32)	Warren
Wheelwright WWTP	MA0102431	Ware River	0.027 (0.04)	0.043 (0.07)	Hardwick

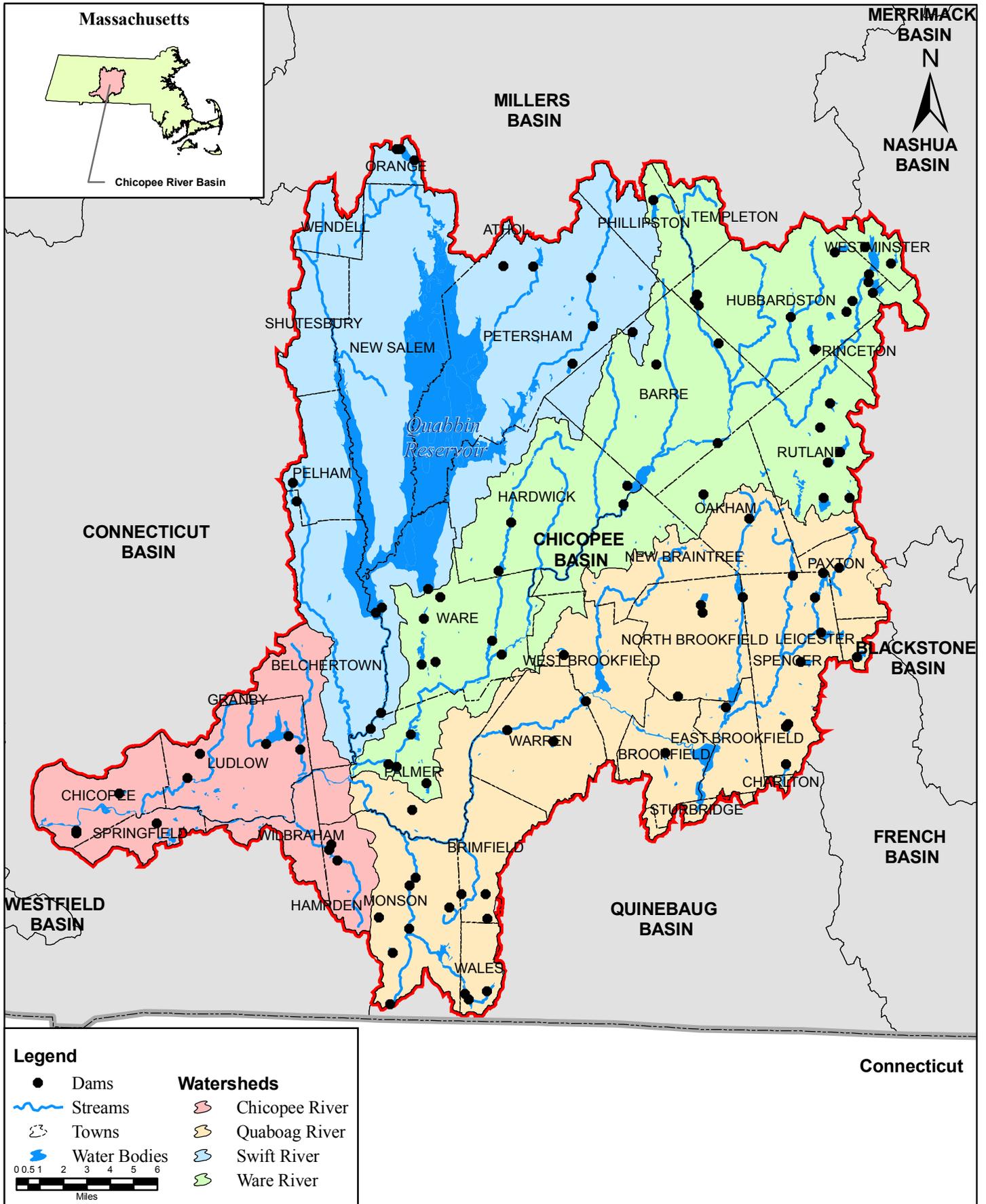
Legend

- D NPDES Permits
- Streams
- Towns
- Water Bodies

Watersheds

- Chicopee River
- Quaboag River
- Swift River
- Ware River

Figure 1.4.3-3. Location of Dams within the Chicopee River Basin.



1.5 Supplemental Background Information

The Assessment Report served as the primary document for providing a summary of the physical, ecological and social aspects of the Chicopee River basin. However, additional studies became available during or after the publication of the Assessment Report, which were valuable to assessing the Basin's needs. Many of these documents also provided recommendations, which were helpful for identifying and prioritizing goals, objectives, and actions for the WAP. The following is a summary of these studies, which are organized by issue (where appropriate).

In January 2003, the former Chicopee River Watershed Team¹ developed a draft annual work plan for the Massachusetts Watershed initiative (MWI) before it was eliminated. The goal of the report was to identify major environmental issues in the Chicopee River basin, and to propose a number of high priority projects to address those issues. The work plan summarized activities and accomplishments of past years, listed ongoing priorities for the Basin, and proposed priority actions to be conducted during the 2004 fiscal year.

1.5.1 Water Quantity

A seasonal water movement study funded by EOE, through the Massachusetts Department of Environmental Management (MDEM) was conducted during 2001 for the Chicopee River basin ([Gomez and Sullivan, 2003](#)). The study evaluated streamflows, precipitation, water withdrawals, wastewater discharges, and interbasin water transfers to quantify and describe water movement within the Basin. The evaluation placed emphasis on 2001, as water supply records and other water reports were readily available for that time period. The executive summary for this report is provided in [Appendix C](#) to provide an overview of the study and the key findings.

1.5.2 Water Quality

In 2004, the Division of Watershed Management released *The Massachusetts Year 2004 Integrated List of Waters* document ([MDEP, 2004](#)), which identified the status of Massachusetts waters according to Sections 303(d) and 305(b) of the Clean Water Act. The report lists water bodies in the state according to the following five categories:

- 1) Unimpaired and not threatened for all designated uses;
- 2) Unimpaired for some uses and not assessed for others;
- 3) Insufficient information to make assessments for any uses;
- 4) Impaired or threatened for one or more uses but not requiring the calculation of a TMDL; and
- 5) Impaired or threatened for one or more uses and requiring a TMDL.

The Commonwealth of Massachusetts is not listing any waters in Category 1, as there is a state-wide health advisory pertaining to the consumption of finfish. The list of water bodies within the Chicopee River basin pertaining to Categories 3 and 5 are provided in [Section 2.1.1](#).

The Pioneer Valley Planning Commission (PVPC) conducted an assessment of the stormwater infrastructure, existing water quality data, and local storm water regulations for the Chicopee River watershed between August 2000 and June 2002. The findings were used to produce an assessment report for the Chicopee River watershed ([PVPC, 2004](#)). The purpose of the assessment was primarily to provide municipalities and interested members of the public with a comprehensive view of the current stormwater

¹ The Watershed Team refers to a group of stakeholders, facilitated by a Watershed Team Leader, that existed from 1998-2003. The Watershed Team was part of the Massachusetts Watershed Initiative, which was a program that existed at the Executive Office of Environmental Affairs from 1993-2003.

management techniques and to assist municipalities in meeting the Environmental Protection Agency's (EPA) National Pollutant Discharge Elimination System Phase II Minimum Control Measures. In addition, the report identifies and assesses best management practices (BMP) within the watershed, describes the methodologies and results of the assessment, and lists general recommendations to help other watersheds within the Basin conduct similar assessments. The executive summary of this document is provided in [Appendix D](#).

A total phosphorous TMDL was developed for the Quaboag and Quacumquasit ponds ([MDEP, 2005](#)). The lakes are listed on the "Massachusetts Year 2004 Integrated List of Waters" for metal and exotic species and have had a history of algal blooms. The TMDL establishes a phosphorous limit for each lake to help prevent further water quality degradation and to ensure that each lake meets state water quality standards. "The implementation of the TMDL is comprised of 4 parts: 1) Upgrades to the Spencer Wastewater Treatment Plant, to meet 0.2 mg/l (1.8 lb/day) summer limit, 2) Control of nonpoint source pollution targeting Phase II stormwater controls by Town of Spencer and MassHighway for State Route 9, Route 31 and Route 49, by requiring roadway sweeping and catchbasin inspection/cleaning twice a year or other approved BMPs, 3) Modification to increase Quacumquasit flood control gate height by adding 18 inches to height, and 4) Modification to Quaboag Pond macrophyte management plant to target specific recreational zones such as boat channels and swimming areas." ([MDEP, 2005](#)). A locally organized watershed survey may also be recommended to help identify and reduce nonpoint source pollution. The successful implementation of this TMDL will require cooperative support in the form of expanded education, obtaining and/or providing funding, and possibly enforcement from local volunteers, lake and watershed associations, and local officials in municipal government ([MDEP, 2005](#)).

1.5.3 Biological Data/Habitat

Fisheries information was not available for inclusion in the Assessment Report. However, the Massachusetts Division of Fisheries and Wildlife (MDFW) conducted fish surveys to determine the species that were present, their length, and the relative abundance of various species throughout the Basin between 1998 and 2004. Fish sampling was conducted at several sites along the major rivers and their tributaries ([see Appendix E](#)).

Information on the counts of anadromous fish species (i.e., fish species that migrate from the ocean to freshwater to spawn) passing upstream of various dams on the Connecticut River are available on the MDFW website (<http://www.mass.gov/dfwele/dfw/dfwrec.htm>). Recent count data for the number of fish passing upstream of the Holyoke Dam (i.e., the first dam on the Connecticut River upstream of the confluence with the Chicopee River) is listed in [Appendix F](#).

Since the completion of the Assessment Report, the Natural Heritage & Endangered Species Program (NHESP) has released additional biodiversity information that pertains to the Chicopee River basin. In particular, they have identified high priority areas for the protection of freshwater biodiversity through the completion of the *Living Waters* final report in December 2003 ([MDFW et al., 2003](#)). Core habitats identified in the *Living Waters* report are intended to be used in combination with Core Habitats identified by the *BioMap* project to identify high priority areas for conservation within the state. Moreover, in December 2004 NHESP released more specific information with regard to Core Habitats in the form of Town Core Habitat Reports for the Chicopee River basin ([NHESP et al., 2005](#)). "These reports provide rare species lists and biodiversity summaries for both BioMap and Living Waters Core Habitats by town." (personal communication, Chloe Stuart, NHESP, to Mark Wamser, Gomez and Sullivan Engineers, April 28, 2005).

1.5.4 Open Space Land Use and Growth

Major revisions were performed to the Protected and Recreational Open Space layer on MassGIS, which was most recently updated in May 2005. The data schema of this layer changed, and many polygons have been added, revised, or deleted (Source: [MassGIS, 2005b](#)).

2.0 GOALS, OBJECTIVES AND PRIORITY ACTIONS

Listed below are individual priority actions to be taken to achieve each goal and objective that was identified throughout the WAP process. For more information on potential partners for implementing the following actions and potential funding sources, see the Action Matrix in [Section 3](#) and Potential Sources of Funding in [Section 4](#), respectively. In addition, the Action Matrix ([Section 3](#)) prioritizes actions that are recommended for implementation over the next five years.

Based on overall public input, it is believed that implementation of actions at the local level will be the most effective way to address environmental issues within the Basin. Particular interest should focus toward the reduction of nonpoint source pollution, collection of additional information to fill data gaps (i.e., the lack of spatial data coverage available to perform complete and accurate assessments and/or to identify sources of pollution), and the organization of environmental resources. Effective public education will be critical to ensure the sustainable future of the Chicopee River basin and therefore should be encouraged as a component of all priority actions within the Basin.

Each major watershed within the Basin (i.e., Chicopee, Ware, Quaboag, and Swift) has its own particular environmental concerns that are sometimes overlooked when examining the Basin as a whole. Therefore, objectives and priority actions that are predominately intended for a particular watershed are indicated in parentheses next to the respective action. If not specified, then the action applies to the entire Chicopee River basin.

Ideally a separate action plan should be developed for each major watershed to ensure that these issues are not overlooked at the basin-wide scale. However, this was difficult to accomplish due to the lack of information that is currently available for the Chicopee River basin. Future WAPs for the Basin should address issues associated with each of the four major watersheds as separate action plans for each watershed. This approach should become less arduous in the future as more data becomes available and information is organized for each major watershed.

2.1 Goal: Protect and Improve Water Quality

2.1.1 Key Assessment Findings

The water quality of the Chicopee River basin has shown considerable improvement over the past several decades due to the implementation of the Clean Water Act. Currently most assessed portions within the Basin meet the applicable water quality criteria, and water quality shows the general trend of being good in the upper portions and more degraded in the lower portions ([EOEA, 2003](#)).

Despite improvements over the past several decades, many areas still require particular attention to further improve the water quality and to prevent future degradation. In particular, the water quality of rivers is affected by combined sewer overflows (CSOs) during storm events in several communities within each watershed, wastewater treatment plant discharges in the Ware and Quaboag rivers, illicit storm drain connections ([ESS, 2001](#)), and nutrient loading from nonpoint source pollution, which is suspected to occur from residential areas, agricultural lands, urban and commercial areas, golf courses, and construction areas ([ESS, 2001](#)). In addition, lake water quality is impaired by non-native and noxious plants, turbidity, mercury, and flow alterations ([MDEP, 2001](#)).

Section 303(d) of the Clean Water Act, requires states to identify waterbodies that do not meet surface water quality standards. Waterbodies that do not meet these standards are to be prioritized and scheduled for the development of a TMDL by the state. The most recent report, *Massachusetts Year 2004 Integrated List of Waters*, identified waterbodies (see [Table 2.1.1-1](#)) that require a TMDL assessment within the Basin. Non-native species and noxious aquatic plants are the most common cause for impairment in lakes and ponds; whereas pathogens are the most common cause of impairment in rivers.

As part of the Assessment Report, the former Chicopee Watershed Team Leader conducted a water quality analysis of 44 sub-watersheds within the Basin using the Watershed Analyst tools available on MassGIS ([EOEA, 2003](#)). Ranking the results from this pollutant loading analysis indicated that the following sub-watersheds should be the primary focus for remedial attention and follow-up monitoring:

Sub-watershed	Watershed	Rank
Poor Brook	Chicopee	1
Abbey Brook	Chicopee	2
Cooley Brook	Chicopee	3
Minechoag Brook	Chicopee	4
Fuller Brook	Chicopee	5
Coys Brook	Quaboag	6
Willow Brook	Quaboag	7

Note: The lower the rank number the higher the priority (e.g., Rank = 1 is the highest priority).

A considerable need exists for more raw data collection, follow-up sampling, and analysis to allow for “more accurate and complete” river segment and lake assessments ([MDEP, 2001](#)). For example, the *1998 Water Quality Assessment Report* demonstrated that insufficient data were available to adequately assess approximately half of the river segments for the four main designated uses (i.e., aquatic life, primary contact recreation, secondary contact recreation, and aesthetics) and approximately half of the lakes for trophic status ([MDEP, 2001](#)²). Moreover, the *Massachusetts Year 2004 Integrated List of Waters*, identified 34 waterbodies ([Table 2.1.1-2](#)) that did not contain sufficient information to make an

² MDEP is in the process of preparing a more recent and comprehensive water quality assessment of the Chicopee River basin.

assessment for any uses. Efficiency of water quality data collection could be maximized by coordinating sampling efforts between federal, state, and local sampling initiatives.

A large portion of the Basin is devoted to providing safe clean drinking water to the residents of Massachusetts. For example, the combined watershed area of surface water supplies within the Basin is approximately 307 mi² (more than 42% of the Basin's total area). This area includes the Metropolitan District Commission (MDC)/MWRA Quabbin/Ware River system, which is the primary water supply source for most of the cities and towns near Boston and supplies drinking water to approximately half of the state's population.

The Assessment Report ([EOEA, 2003](#)) demonstrated that the 2000 and 2001 buildout analysis shows considerable variation in the potential growth of communities throughout the Basin. For the combination of all of the communities within the Basin, the analysis predicted future growth to be greater than 130 % and almost half of the communities could experience a future population growth in excess of 300 %. This future growth could result in an additional 393,572 acres of development, almost 57 MGD of additional water demand, more than 283,000 additional tons/year of solid waste generation, and almost 3,800 miles of additional roadways. The rapid growth in particular communities along with the potential for significant future growth will likely apply substantial pressure on the Basin's aquatic resources. Therefore, careful planning will be required, including the protection of surface water and groundwater drinking supplies, to sustainably meet the demands of the growing population ([EOEA, 2003](#)).

Table 2.1.1-1. Massachusetts Category 5 Waters within the Chicopee River Basin (i.e., Waters requiring a TMDL)

(Source: [MDEP, 2004](#))

Name	Location	Cause of Impairment
Alden Pond	Ludlow	<ul style="list-style-type: none"> • Nutrients • Noxious aquatic plants
Bemis Pond	Chicopee	<ul style="list-style-type: none"> • Suspended solids
Brookhaven Lake	West Brookfield	<ul style="list-style-type: none"> • Turbidity
Chicopee River	Source, confluence of Ware River and Quaboag River, Palmer to Red Bridge Impoundment Dam, Wilbraham/Ludlow.	<ul style="list-style-type: none"> • Pathogens
Chicopee River	Red Bridge Impoundment Dam to Wilbraham Pumping Station (old WWTP), Wilbraham/Ludlow.	<ul style="list-style-type: none"> • Pathogens
Chicopee River	Wilbraham Pumping Station, Wilbraham/Ludlow to Chicopee Falls, Chicopee.	<ul style="list-style-type: none"> • Pathogens
Chicopee River	Chicopee Falls to confluence with Connecticut River, Chicopee.	<ul style="list-style-type: none"> • Pathogens
Cranberry River	Source, outlet Cranberry Meadow Pond to confluence with Sevenmile River, Spencer.	<ul style="list-style-type: none"> • Chlorine
Dean Pond	Oakham	<ul style="list-style-type: none"> • Noxious aquatic plants • Turbidity
Doane Pond	North Brookfield	<ul style="list-style-type: none"> • Noxious aquatic plants
Eames Pond	Paxton	<ul style="list-style-type: none"> • Organic enrichment/Low DO
East Branch Ware River	Outlet Bickford Pond, Hubbardston to confluence with the West Branch Ware River, Barre.	<ul style="list-style-type: none"> • Organic enrichment/Low DO
Forget-Me-Not Brook	North Brookfield WWTP, North Brookfield to confluence with Dunn Brook, East Brookfield/Brookfield.	<ul style="list-style-type: none"> • Cause Unknown • Unknown toxicity • Organic enrichment/Low DO • Taste, odor and color
Pottapaug Pond Basin	Petersham	<ul style="list-style-type: none"> • Metals
Powder Mill Pond	Barre	<ul style="list-style-type: none"> • Metals
Quabbin Reservoir	Petersham/Pelham/Ware/Hardwick/Shutesbury/Belchertown/New Salem	<ul style="list-style-type: none"> • Metals
Quaboag Pond	Brookfield/East Brookfield	<ul style="list-style-type: none"> • Metals • Exotic species
Quaboag River	Warren WWTP, Warren to Route 32 bridge, Palmer/Monson.	<ul style="list-style-type: none"> • Pathogens • Taste, odor and color
Quaboag River	Route 32 bridge, Palmer/Monson to confluence with Ware River	<ul style="list-style-type: none"> • Pathogens

Name	Location	Cause of Impairment
	forming headwaters of Chicopee River, Palmer.	
Quacumquasit Pond	Brookfield/East Brookfield/Sturbridge	<ul style="list-style-type: none"> • Metals • Exotic species
Sevenmile River	Source, outlet Browning Pond to confluence with Cranberry River, Spencer.	<ul style="list-style-type: none"> • Pathogens
Sevenmile River	Confluence with Cranberry River, Spencer to confluence with East Brookfield River, East Brookfield.	<ul style="list-style-type: none"> • Pathogens
Ware River	Ware Dam, Ware to Thorndike Dam, Palmer.	<ul style="list-style-type: none"> • Pathogens
Ware River	Confluence of East Branch Ware and West Branch Ware rivers to MDC intake, Barre.	<ul style="list-style-type: none"> • Organic enrichment/Low DO • Thermal modifications
Lake Whittemore	Spencer	<ul style="list-style-type: none"> • Turbidity

Table 2.1.1-2. Massachusetts Category 3 Waters within the Chicopee River Basin (i.e., No Uses Assessed)
 (Source: [MDEP, 2004](#))

Name	Location
Adams Pond	Oakham
Bemis Road Pond	Hubbardston
Bennett Street Pond	Palmer
Brooks Pond	Petersham
Calkins Brook	Headwaters, southeast of Baptist Hill, Palmer to confluence with Twelvemile Brook, Wilbraham.
Carter Pond	Petersham
Chicopee Brook	Headwaters, east of Peaked Mountain, Monson to confluence with Quaboag River, Monson.
Chicopee Brook Pond	Monson
Cloverdale Street Pond	Rutland
Comins Pond	Warren
Cranberry Meadow Pond	Spencer/Charlton
Cunningham Pond	Hubbardston
Cusky Pond	New Braintree
Dimmock Pond	Springfield
Dunn Brook	From confluence with Forget-Me-Not Brook, East Brookfield/Brookfield to confluence with Quaboag River, Brookfield.
East Brookfield River	Outlet Lake Lashaway to Quaboag Pond, East Brookfield.
Edson Pond	Rutland
Fivemile Pond South	Springfield
Gaston Pond	Barre
Harris Pond	Ludlow
Howe Pond	Spencer
Lovewell Pond	Hubbardston
Moose Hill Reservoir	Spencer/Leicester
Moulton Pond	Rutland
Muddy Pond	Oakham/Rutland
Murphy Pond	Ludlow
Peppers Mill Pond	Ware
Quaboag River	Outlet of Quaboag Pond, Brookfield to Route 67 bridge, West Brookfield.
South Barre Reservoir	Barre
Stone Bridge Pond	Templeton
Swift River	Upper Bondsville Mill Dam, Belchertown/Palmer to confluence with Ware River, Palmer.
Thayer Pond	Rutland
Town Barn Beaver Pond	Petersham
Williamsville Pond	Hubbardston

2.1.2 Objectives and Priority Actions

The following is a list of objectives and priority actions focusing on the goal of protecting and improving water quality within the Chicopee River basin. Based on overall public input, implementation of actions to protect surface water and groundwater drinking supplies and to monitor and reduce CSOs and nonpoint source pollution should be the primary focus within the Basin.

Objectives:

- Protect surface water and groundwater drinking supplies
- Identify and reduce CSOs and nonpoint source pollution
- Assist municipalities with water resource planning and sustainable development to improve water quality
- Improve condition of storm water infrastructure, monitoring frequency, and maintenance frequency

Priority Actions:

- Assist municipalities to plan for and protect future surface water and groundwater drinking supplies through a process of integrated water resource planning
 - For guidance see recommendations provided in the Massachusetts Water Policy ([EOEA, 2004](#))
- Continue to support state and federal agencies, and planning commissions to identify and reduce CSOs
- Better coordinate sampling between existing federal, state, and local sampling efforts
 - For example, see MDEP's Strategic Monitoring and Assessment for River basin Teams (SMART) sampling fact sheets in [Appendix G](#).
- Continue water quality monitoring at MDEP's present sampling locations and expand sampling to assess priority waters identified in the Nonpoint Source Action Strategy for the Chicopee River Basin ([MDEP, 2003](#))
- Reduce phosphorous levels in those lakes identified as having high values in the document entitled, *Total Maximum Daily Loads of Phosphorous for Selected Chicopee Basin Lakes* ([MDEP, 2002](#)) and support the implementation of the total phosphorous TMDL for Quaboag and Quacumquasit Ponds ([MDEP, 2005](#)) -- [**Chicopee and Quaboag watersheds**]
 - Conduct nonpoint source pollution surveys
 - Develop lake management plans
 - Continue with public education efforts to reduce phosphorous levels

- Implement appropriate remediation activities for each lake (See following table)

Source: Table adapted from MDEP (2002)

Lake Name WBID →	Browning Pond MA36025	Long Pond MA36083	Minechoag Pond MA36093	Mona Lake MA36094	Spectacle Pond MA36142	Sugden Reservoir MA36150	Wickaboag Pond MA36166
Forest BMPs	x					x	x
Agricultural BMPs						x	x
Residential BMPs						x	x
Septic System Maintenance	x					x	x
Urban BMPs		x	x	x	x	x	
Highway BMPs			x		x		
In-Lake Management	x	x	x	x	x	x	x

- Implement recommendations identified by PVPC in the *Chicopee River Watershed Basin Assessment* (PVPC, 2004), especially those related to public education, water quality sampling, and better construction and maintenance of stormwater BMPs -- [**Chicopee watershed**]
 - Train DPW field crews in the basics of GIS mapping and GPS data collection so that they are capable of collecting and inputting new information from field data collection
 - Continue to develop the stormwater maps and database to include such information as size of drain pipes, depth of drain lines, direction of flow, depth of catchbasin sumps, size of outfalls, construction materials, maintenance logs, and any other information that will provide a comprehensive program for stormwater infrastructure management.
 - Conduct dry weather illicit discharge detection monitoring at mapped outfall locations to meet NPDES Phase H requirements
 - Expand GIS stormwater mapping to entire municipal stormwater system
 - Delineate and map stormsheds for each outfall
 - Develop operation and maintenance plans for BMPs
 - Dredge catchbasins semi-annually
 - Educate the public about the importance of stormwater management.

- Encourage stormdrain stenciling programs.
- Use native plants, adapted to site conditions and soils, to encourage establishment of thriving plant communities for nutrient uptake and sediment collection in BMPs
- Encourage the use of constructed BMPs as attractive landscape features
- Require four-foot minimum catchbasin sump depths
- Collect baseline water quality data for the main stem of the Chicopee River
- Collect bacteria data during dry and wet weather monitoring to evaluate the effectiveness of Springfield's and Chicopee's CSO abatement projects
- Collect baseline data for tributaries
- Sample stormwater outfalls
- Update the water quality database as new information becomes available
- Implement local regulations to address NPDES Phase II Minimum Control Measures for Illicit Discharge Detection and Elimination, Construction Site Stormwater Runoff Control, and Post-construction Stormwater Management.
- Require long-term maintenance plans for stormwater BMPs.
- Educate the public about the importance of managing stormwater through local regulations
- Implement specific recommendations identified for each community
- Encourage sustainable residential planning and develop model bylaws for municipalities to use to govern nonpoint source pollution and erosion.
 - Some examples and guidance can be found at the following websites:
 - <http://www.ago.state.ma.us/sp.cfm?pageid=1036>
 - <http://www.horsleywitten.com/pubs/MSM-bylaw-regs.pdf>
 - <http://www.mapc.org/lid.html>
- Identify existing Best Management Practice (BMP) documents and distribute them to Planning Boards, Boards of Selectman, Conservation Commissions, and Highway Departments. Encourage the implementation of agricultural, urban/runoff, and residential BMPs to reduce anthropogenic impacts on surface and groundwater quality. In the near term, particular interest should be paid toward those areas that have been identified as having high pollutant loads as well as areas that are beginning to show degradation³.

³ Efforts are underway to develop and republish the Massachusetts Nonpoint Source Management Manual ("The MegaManual") for municipal officials on behalf of the MDEP. Revisions will reflect current knowledge with regard to nonpoint source pollution and new or revised regulatory programs. The revised manual will be restructured to maximize accessibility of information in electronic format as well as in print. Management alternatives for non

- Examples of BMP documents for lake preservation are provided in [Appendix H](#).
- Assist municipalities, wastewater districts, and public water supplies in efforts to comply with federal and state requirements relating to water quality protection. This may require the construction of new facilities and/or improvement of existing facilities.
 - Promote and fund an increased frequency of catch basin and street cleaning, and construct deeper catch basins and/or improve existing catch basins within urban areas ([ESS, 2001](#)). Also investigate emerging technologies to replace catch basins with more effective methods of dealing with runoff.
 - Continue follow-up sampling and remediation activities for the seven tributaries identified as having high pollutant load scores in the Assessment Report ([EOEA, 2003](#)) -- [**Chicopee and Quaboag watersheds**]
 - Evaluate impacts of landfills on water quality and implement landfill BMPs where needed -- [**Ware watershed**]
 - Support efforts to address MDEP's river segment and lake water quality recommendations identified in the most recent Water Quality Assessment Report. Please note, not all of the recommendations from the *1998 Water Quality Assessment Report* (see [Appendix I](#)) were listed as priority actions in this report, as they are due to be updated by a more recent water quality assessment of the Basin, which was not available for consideration in the WAP.

point source pollution problems will likely be covered in terms of applicable federal, state, and local regulatory programs and appropriate BMPs.

2.2 *Goal: Protect Aquatic Resources and Freshwater Biodiversity*

2.2.1 Key Assessment Findings

The Chicopee River basin offers a wide variety of habitat types, which has resulted in substantial richness of aquatic and terrestrial wildlife species. Approximately 70 % of the Basin is forested with more than 10,000 acres of wetlands and approximately 32,000 acres covered by freshwater. Almost 289 mi² (~40%) of the Basin is considered to be protected open space ([Figure 2.2.1-1](#)). However, it is important to note that more than 43% of this area is in large areas of the Massachusetts Department of Conservation and Recreation (MDCR) controlled watershed lands in the Quabbin and Ware watersheds. To some extent this gives a false impression of the open space status, as many Basin communities have little area that is protected as open space ([EOEA, 2003](#)).

Fish and wildlife occurrences vary throughout the Basin and reflect the diverse range of habitat conditions that exist. NHESP indicates that there are several Core Habitats (i.e., high priority habitats for biodiversity conservation) representing more than 14 habitat types and 61 species of special concern (e.g., 16 invertebrates, 21 plants, and 24 vertebrates) within the Basin ([EOEA, 2003](#)). NHESP has mapped BioMap ([Figure 2.2.1-2](#)) and Living Waters ([Figure 2.2.1-3](#)) Core Habitats to identify high priority sites for terrestrial/wetland and aquatic biodiversity conservation respectively. Moreover, NHESP further identified the following key sites for preservation within the Basin (personal communication, Chloe Stuart, NHESP, to Mark Wamser, Gomez and Sullivan Engineers, April 28, 2005):

- Quabbin Reservoir and surrounding watershed lands (BM504 and LW309)
- East Branch of the Swift River and Moccasin Brook (LW290)
- Upper Ware River Watershed in Barre, Hubbardston, Rutland, and Oakham (BM518)
- Several sections of the Ware River (LW160, LW202, LW303, LW310)
- Westover Air Reserve Base and adjacent areas in Ludlow and Chicopee (BM900)
- Wine Brook wetlands in Phillipston and Templeton (BM536)
- Quaboag River and tributaries in Brookfield and West Brookfield (BM898)
- Hitchcock Mountain and Great Brook in East Brookfield and Sturbridge (BM915)
- Brookfield River and adjacent wetlands in East Brookfield (BM920)
- Kings Brook and surrounding forest in Palmer (BM936)
- Wolf Swamp – Trout Brook – Cranberry Pond complex in Brookfield and Sturbridge (BM963)
- Brimfield State Forest and surrounds in Brimfield, Wales, and Monson (BM1017)

The Basin is relatively “water rich” with a plethora of surface waterbodies including a total of 174 recognized lakes, ponds, or impoundments and 136 named streams, which flow an estimated 464 miles ([EOEA, 2003](#)). However, many of the lakes within the Basin have dams associated with them, which can potentially affect streamflows. MDEP’s *1998 Water Quality Assessment* report ([MDEP, 2001](#)) identified the following two areas within the Basin where dams and/or water withdrawals may have adverse impacts on downstream conditions:

- Upper Ware River watershed – water withdrawals and/or reservoir operations may exacerbate low streamflows, high water temperatures, and low dissolved oxygen concentrations that occur within the upper Ware watershed;
- Chicopee River watershed – large hydroelectric dams may be impacting streamflow and habitat conditions within the Chicopee River and are preventing the migration of diadromous fish species.

Data from the U.S. Fish and Wildlife Service indicate that 111 dams within the Basin are considered barriers to fish passage. Six hydroelectric facilities (all Federal Energy Regulatory Commission [FERC] exempt facilities) are located along the Chicopee River. Some of these facilities are permitted by FERC in their operating license to fluctuate the water level elevations in their headponds for operational purposes. Thus, the power generation by these facilities causes a peaking of the river's streamflow downstream of the facility. This trend of streamflow peaking is evident at the USGS stream gage in Indian Orchard (see [Figure 2.2.1-4](#)), which is downstream of four of these facilities (e.g., Red Bridge, Collins Dam, Putts Bridge, and Indian Orchard hydro facilities). Moreover, diadromous species such as American shad, river herring, Atlantic salmon, and American eel that migrate up the Connecticut River into the Chicopee River are unable to pass upstream of the Dwight Dam, the first hydroelectric facility on the Chicopee River, due to the lack of fish passage ([EOEA, 2003](#)).

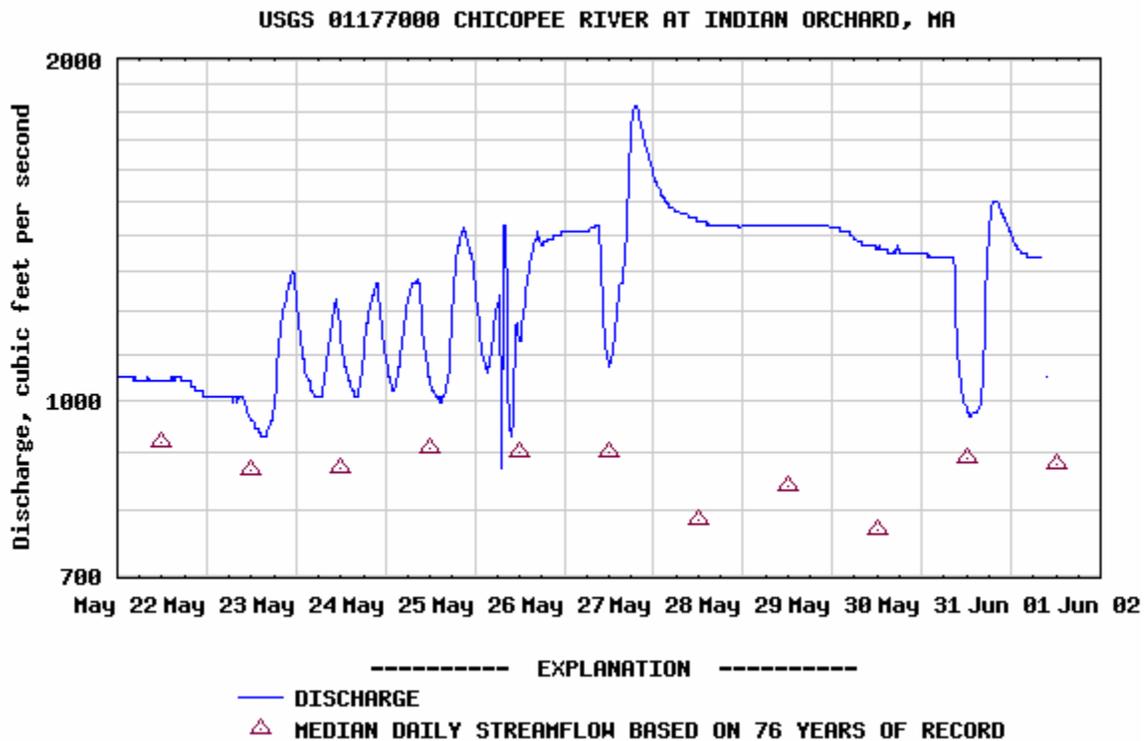


Figure 2.2.1-4. Graph displaying discharge and mean daily streamflow for USGS gage # 01177000 located at Indian Orchard, MA. Note the unusual daily fluctuations in streamflow expected to be caused by hydroelectric facilities.

A number of wastewater treatment plants (WWTPs) discharge to rivers within the Basin. These facilities include three minor permittees (e.g., Barre, Hardwick-Gilbertville, and Hardwick-Wheelwright) and five major permittees (e.g., North Brookfield, Palmer, Spencer, Ware and Warren). The *1998 Water Quality Assessment Report* noted that several of these facilities had toxicity test failures, which were associated with *Non-Support*, *Threatened*, and *Alert* status designations for *Aquatic Life Use* downstream of the facility ([MDEP, 2001](#)).

As mentioned earlier, the rapid growth in particular communities along with the potential for significant future growth will likely put substantial pressure on the Basin's aquatic resources and therefore will require careful planning ([EOEA, 2003](#)).

Figure 2.2.1-1. Protected Open Space within the Chicopee River Basin

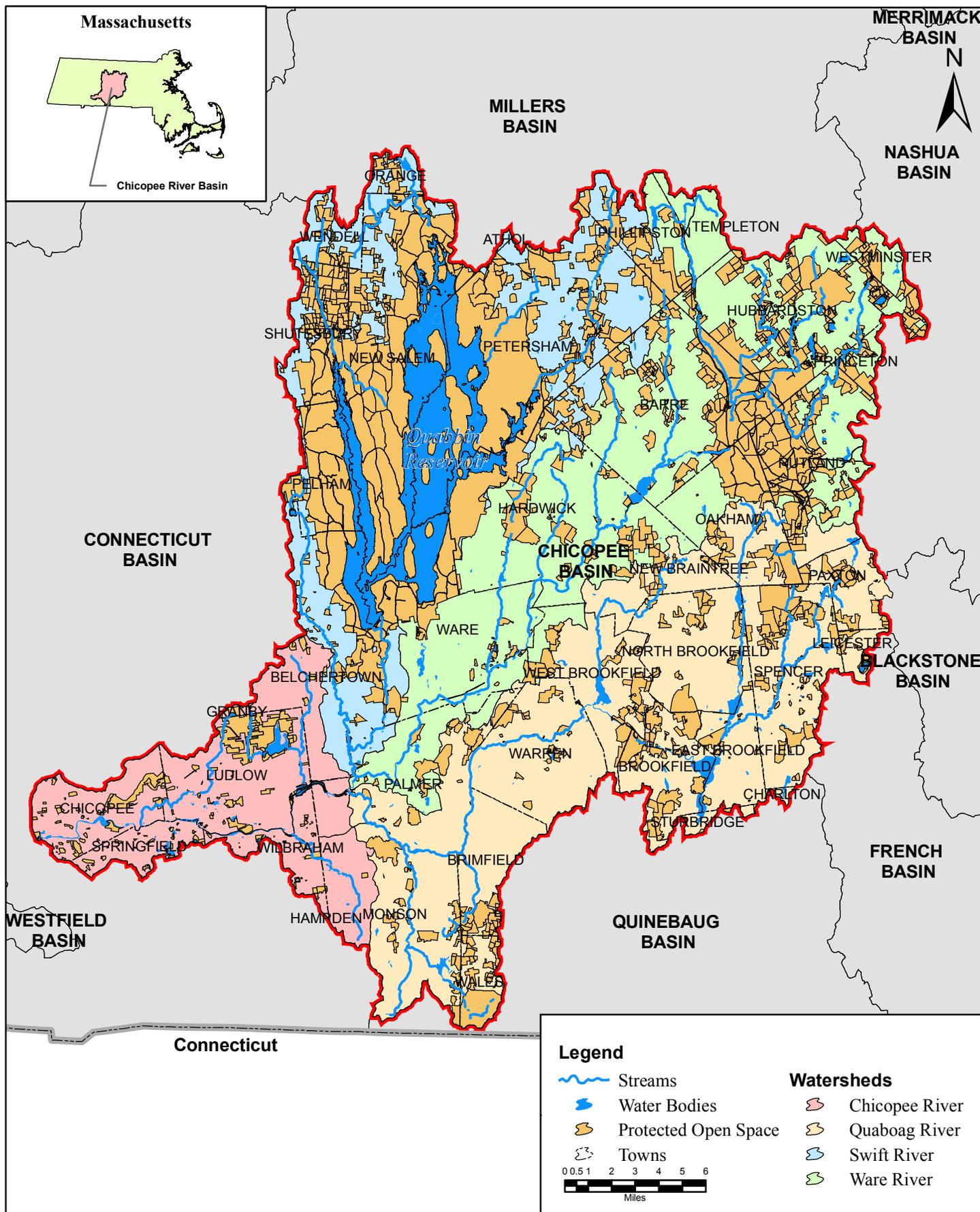


Figure 2.2.1-2. NHESP BioMap Core Habitats within the Chicopee River Basin

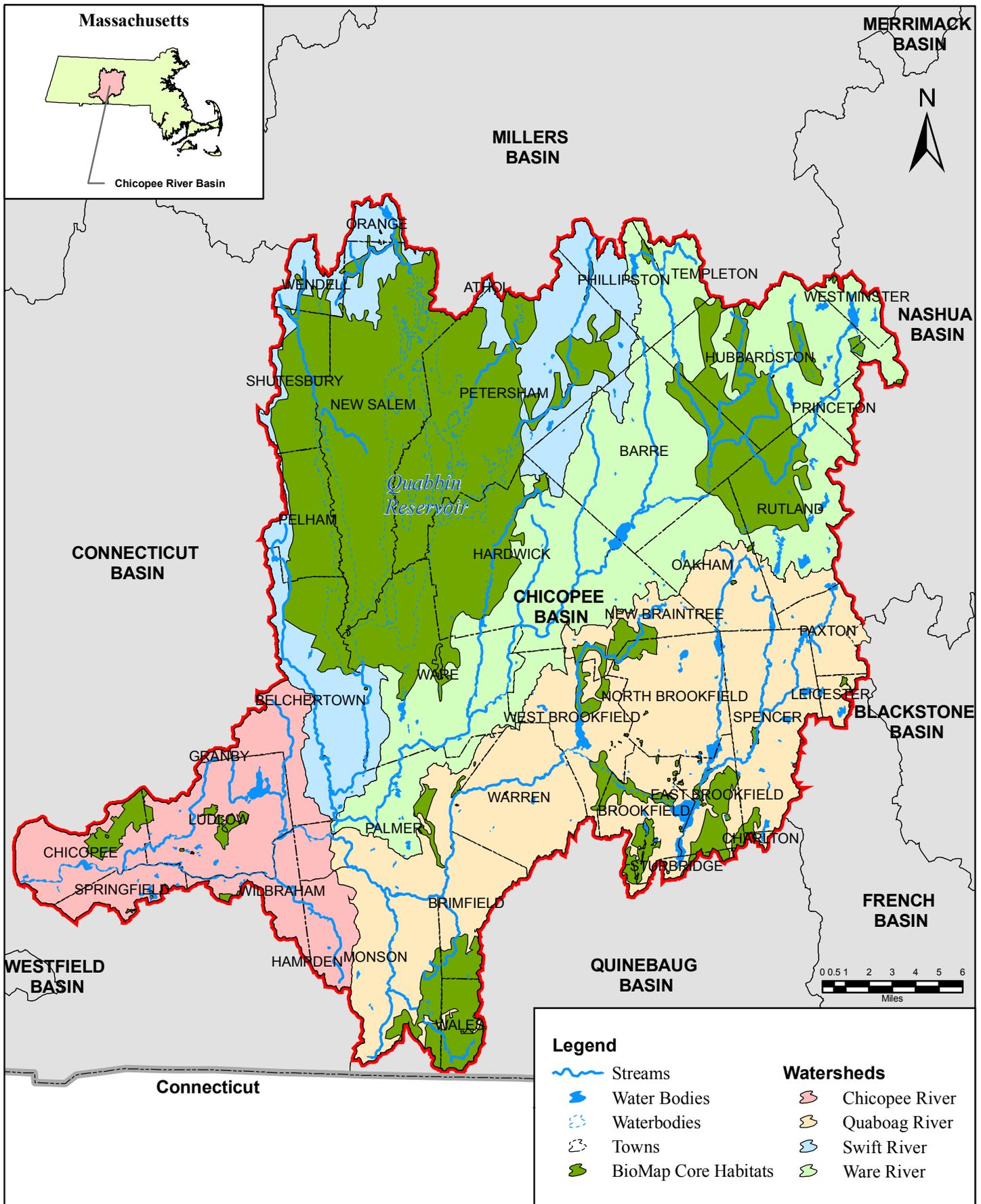
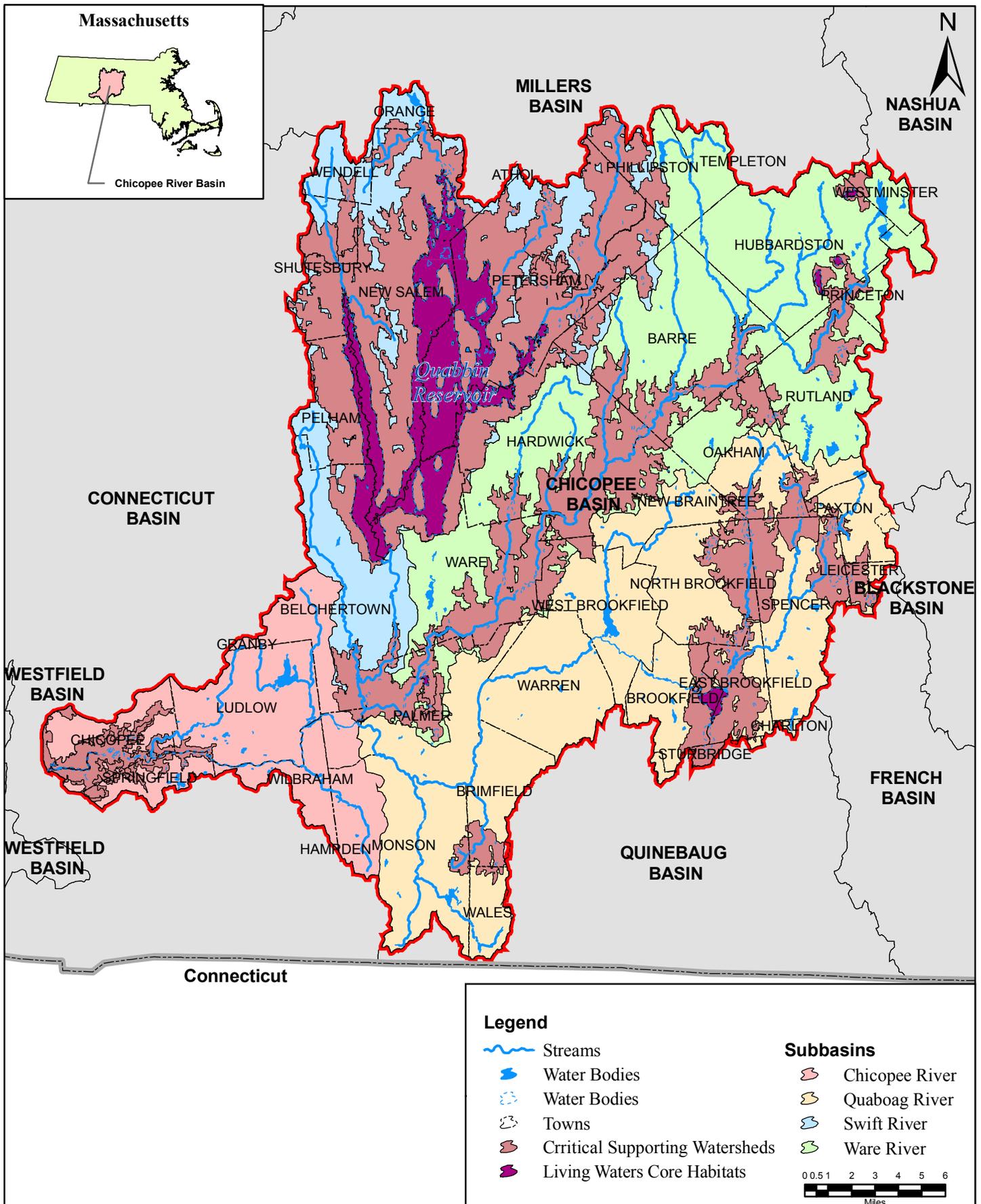


Figure 2.2.1-3. NHESP Living Waters Core Habitats and Critical Supporting Watersheds within the Chicopee River Basin



2.2.2 Objectives and Priority Actions

The following is a list of objectives and priority actions focusing on the goal of protecting aquatic resources and freshwater biodiversity within the Chicopee River basin. Based on overall public input, helping towns and municipalities to plan for and protect aquatic resources and collecting additional information on biological resources should be the priority for the short term.

Objectives:

- Increase the collection and analysis of data pertaining to biological resources and habitats
- Protect open space and ecologically sensitive habitats
- Assess potential threats, management, and restoration needs for *Living Waters* Core Habitats and Critical Supporting Watersheds
- Identify impassible barriers, such as dams and culverts, and consider upstream/downstream fish passage where applicable

Priority Actions:

- Investigate and control the spread of non-native aquatic and wetland vegetation -- [**Quaboag watershed**]
 - For guidance see the Invasive Plant Atlas of New England (IPANE) website (<http://invasives.eeb.uconn.edu/ipane/index.htm>)
- Assist municipalities with open space protection and growth management/protection. Particular emphasis should be placed on protecting *Living Waters* Core Habitats and Critical Supporting Watersheds. Emphasis should also be placed on preserving the rural character in fast-growing communities including preservation of farmland and forests.
- Evaluate the affects of flow management practices on streamflows and corresponding water quality problems identified by MDEP (2001) in the upper Ware watershed⁴ -- [**Ware watershed**]. Particular emphasis should be placed on the following:
 - Collect additional data to determine the frequency, duration and spatial extent of the low flow conditions, dissolved oxygen concentrations and temperatures in the upper Ware River. Conduct follow-up studies to determine if attempts to optimize streamflow result in higher dissolved oxygen concentrations and lower water temperatures.
 - Habitat assessments should be conducted in the upper Ware Watershed to evaluate the relationship between habitat and streamflow

⁴ Please note: Priority actions associated with streamflows have been listed under the “Protect Aquatic Resources and Freshwater Biodiversity” goal. However, streamflows are known to influence the physical, chemical, and biological nature of the lotic environment depending upon flow conditions. Therefore, implementation of priority actions associated with streamflows is also likely to benefit the water quality and physical characterizes of the river as well.

- Evaluate Mare Meadow and Bickford reservoir operations and optimize water withdrawal practices to maintain minimum flows and natural flow regimes to the extent possible
- Evaluate the flow management practices of lakes within the upper Ware Watershed to determine whether they result in elevated water temperatures
- Optimize water withdrawal practices to maintain minimum streamflow and natural flow regimes to the extent possible
- Increase collection of information with regard to rare species and ecologically sensitive aquatic habitats (e.g., rare species surveys, freshwater mussel surveys, certification of vernal pools, etc.)
- Increase stream assessments and restoration activities
- Evaluate the need for and increase upstream and downstream fish passage for diadromous fish species. Initially, emphasis should be placed on the Dwight Dam (i.e., the lowermost dam on the Chicopee River). After installing passage structures, fish passage triggers should be established at the Dwight Dam to determine when fish passage is required at subsequent upstream dams -- **[Chicopee watershed]**
- Evaluate the effects of hydroelectric dams on streamflow and habitat conditions ([MDEP, 2001](#), [PVPC, 2002](#)) -- **[Chicopee and Ware watersheds]**

2.3 *Goal: Increase Environmental Knowledge and Access to Environmental Resources*

2.3.1 Key Assessment Findings

Access to environmental knowledge and public education is critical to ensure that the Basin is managed in a sustainable manner for future generations to enjoy. A variety of outreach and educational initiatives have occurred within the Basin to inform communities and residents of various watershed issues. However, this is an ongoing process and much remains to be done ([EOEA, 2003](#)).

Education on watershed issues should continue, particularly to those that are not readily aware of issues and activities occurring within the Basin. In addition, attempts should be made to ensure that education is a byproduct of all goals and objectives intended for the Basin.

In other areas the connection between residents and the environmental resources and issues within a Basin have been further achieved through the development of environmental education centers (see example of Millers River Environmental Center in [Appendix J](#)). These centers may rely on the support from local volunteers and fund raising initiatives. Education centers have the potential to provide a valuable means for educating children and adults with regard to watershed resources and issues, as well as measures that concerned citizens can take to reduce environmental impacts within their watershed.

As previously mentioned, the Chicopee River basin is the largest basin identified for planning purposes in the Commonwealth of Massachusetts. It encompasses all or part of 39 cities and towns in four counties. As expected due to the large size of the Basin, it was difficult to accumulate supplemental information to help identify and prioritize the Basin's needs. Moreover, the majority of available information is descriptive, and little information exists to provide a comprehensive environmental assessment of the Basin or its sub-watersheds ([EOEA, 2003](#)).

Sustainable management of the Chicopee River basin would greatly benefit from a web-based environmental information system that could store environmental reports and data. This system would also serve as a great resource for municipalities, planning organizations, state and federal agencies, and interested citizens, as it would conveniently provide a wealth of knowledge at their fingertips. An information system would also be an ideal location to promote and provide guidance with regard to standardized collection of environmental data. This would ensure that municipalities, watershed/lake organizations, and concerned citizens collect data in a consistent manner; thus, it would enable the maximum utilization of this information and increase its value toward environmental management decisions. Moreover, the creation of such a system would facilitate and encourage stakeholders to work together to achieve common goals and would facilitate networking among groups and interested residents.

2.3.2 Objectives and Priority Actions

The following is a list of objectives and priority actions focusing on the goal of increasing environmental knowledge and access to environmental resources within the Chicopee River basin. Based on overall public input, an information system should be developed for the entire Basin to house environmental data, environmental reports, and to make this information readily available to the public.

Objectives:

- Facilitate the structuring and access to environmental information
- Increase public outreach and education
- Reduce data gaps through increased environmental monitoring and consistency of data collection

Priority Actions:

- Develop an environmental information system for the Chicopee River basin to house environmental reports, data, and data collection standards. This system could start as a pilot project within select communities and then be gradually expanded throughout the Basin.
- Continue with efforts to educate the public e.g., “*Do more outreach, more frequently and to more people*” ([EOEA, 2003](#)). For example, interviews with representatives from the Basin on public cable networks as well as in local newspapers would be an effective way to reach people and to educate them on the Basin’s ecology, environmental issues, activities that are taking place, and how citizens can participate. Awards could also be issued to towns that are actively engaging in BMPs to generate awareness of measures that the towns and concerned citizens can take to reduce their impact on the environment.
- Existing data collection efforts should continue, and new efforts should be initiated to identify data gaps and reduce them through increased environmental monitoring. Efforts should also be made to increase the quality of data collection through adopting and distributing standards to volunteer groups collecting environmental information throughout the Basin.
 - For example, see the efforts of MDEP’s SMART monitoring program ([Appendix G](#)). This program identifies data gaps and works with volunteer organizations to structure and support data collection within select basins.
- Educate local conservation commissions to enable them to monitor, and enforce public works and highway maintenance activities; municipalities should also be encouraged to educate their employees on environmental management practices through peer workshops. For example, members of the public believe that greater “buy-in value” would be achieved among departments of public works and highway departments if they were educated by their peers through peer workshops rather than receiving training from outside entities.
- Increase opportunities for student involvement in assessing the Basin’s environmental condition and needs

- For guidance and some examples refer to SMART monitoring ([Appendix G](#)), Project WET (<http://www.mass.gov/mdc/Dwmed.htm>), Izaak Walton League of America (<http://www.iwla.org/>), etc.
- Support the development of an environmental education center

2.4 Goal: Build Stakeholder Capacity

2.4.1 Key Assessment Findings

“Since the inception of the MWI in the Chicopee River basin in 1998, the need for capacity building among the watershed organizations and municipal boards and commissions in the basin has been clearly articulated. Of the 3 watershed associations that operate in the basin, none has paid staff. All 3 depend on volunteers to run field trips, produce newsletters, maintain mailing lists, and perform the other duties of the organizations. All 3 also operate out of the homes of their directors; none has an office space in which to keep organization records or to have a telephone or answering machine.” ([EOEA, 2003](#))

Attempts were made to contact all three organizations as part of the development of the WAP. However, contact was not made with the Friends of the Five Mile River, and it is believed that they are no longer in operation. The other associations (i.e., the Upper Ware Watershed Association and the Chicopee River Watershed Council) are still operating within the Basin and continue to meet to discuss issues within their watersheds.

The Basin also contains a number of lake and pond associations, some of which are members of the Massachusetts Congress of Lake and Ponds Association, Inc. (COLAP). COLAP is a non-profit organization whose mission is to “preserve, protect, maintain and enhance the environmental, aesthetic, recreational and economic values of lakes and ponds, and to promote watershed management, within the Commonwealth of Massachusetts” (<http://www.macolap.org/aboutus.html>). COLAP also aims to support activities of lake and pond associations and to promote the formation of new lake and pond associations.

To preserve and improve the health of the Chicopee River basin, it is essential to build capacity of local environmental organizations, municipal boards, communities, and their residents to enable them to take a more active role in the environmental management of the Basin. Their role is even more vital now with cutbacks of state budgets and the elimination of the MWI Chicopee Watershed Team. Members of lake and watershed associations have felt the loss of the MWI, especially the loss of connectivity between their organizations and state agencies and the loss of guidance on how to meet their environmental goals and objectives.

2.4.2 Objectives and Priority Actions

The following is a list of objectives and priority actions focusing on the goal of building stakeholder capacity within the Chicopee River basin. Based on overall public input, building the capacity of local organizations is essential to preserve and improve the health of the Basin.

Objectives:

- Increase the capacity of municipalities and local organizations in assessing the Basin’s environmental condition and needs

Priority Actions:

- Support grassroots efforts such as the Massachusetts Congress of Lake and Pond Associations, Inc. (COLAP) to start new lake associations and to build capacity of existing lake associations. Also, support the development of new watershed associations and build capacity of existing watershed associations. This will enable them to effectively collect, monitor, and report environmental information and to educate the public on their efforts.

- Provide municipalities with environmental education, model bylaws and regulations, and resources to encourage pro-active and environmentally sound watershed management
- Provide training or other assistance to enable Conservation Commissions to identify, document and pass on information about rare species and significant habitats in their communities to appropriate state offices (e.g., the NHESP).

2.5 Goal: Enhance Recreational Opportunities

2.5.1 Key Assessment Findings

The abundance of freshwater resources and the large areas of protected open space⁵ within the Chicopee River basin provide excellent opportunities for outdoor recreation. The Quabbin Reservation is one of the most popular outdoor destinations in southern New England due to the exceptional fishing, hiking, and wildlife viewing opportunities. Moreover, numerous other recreational opportunities, including smaller areas of protected open space, also provide recreational opportunities of great value. These opportunities include the following state, federal, and privately-owned sites:

- Public Access Board (PAB) and other boat launch sites;
- DEM parks and forests;
- MDC lands;
- MDFW management areas;
- Federal lands;
- Local lands;
- Private facilities ([EOEA, 2003](#)).

Examples of PAB boat launches and various trail networks throughout the Basin are shown in [Figure 2.5.1-1](#).

Outdoor recreation often serves as an interface between people and the environment. The existence of quality outdoor recreational opportunities has the potential to develop environmental knowledge and to promote environmental stewardship. Enhancement of recreational opportunities should be coordinated with the protection of aquatic resources and open space planning to ensure that recreational endeavors coincide with the needs to protect biodiversity, unique or regionally significant habitats, water supply areas, aesthetics, other recreational opportunities, and to improve quality of life.

2.5.2 Objectives and Priority Actions

The following is a list of objectives and priority actions focusing on the goal of improving the quantity and quality of recreation areas within the Chicopee River basin. Based on overall public input, people believe that the quantity of some recreational opportunities is adequate; however, the quality of these existing activities could be improved. Moreover, the quantity of recreational activities that are limited could be increased.

Objectives:

- Increase law enforcement of misuse
- Increase the number of outdoor recreational opportunities and associated educational benefits

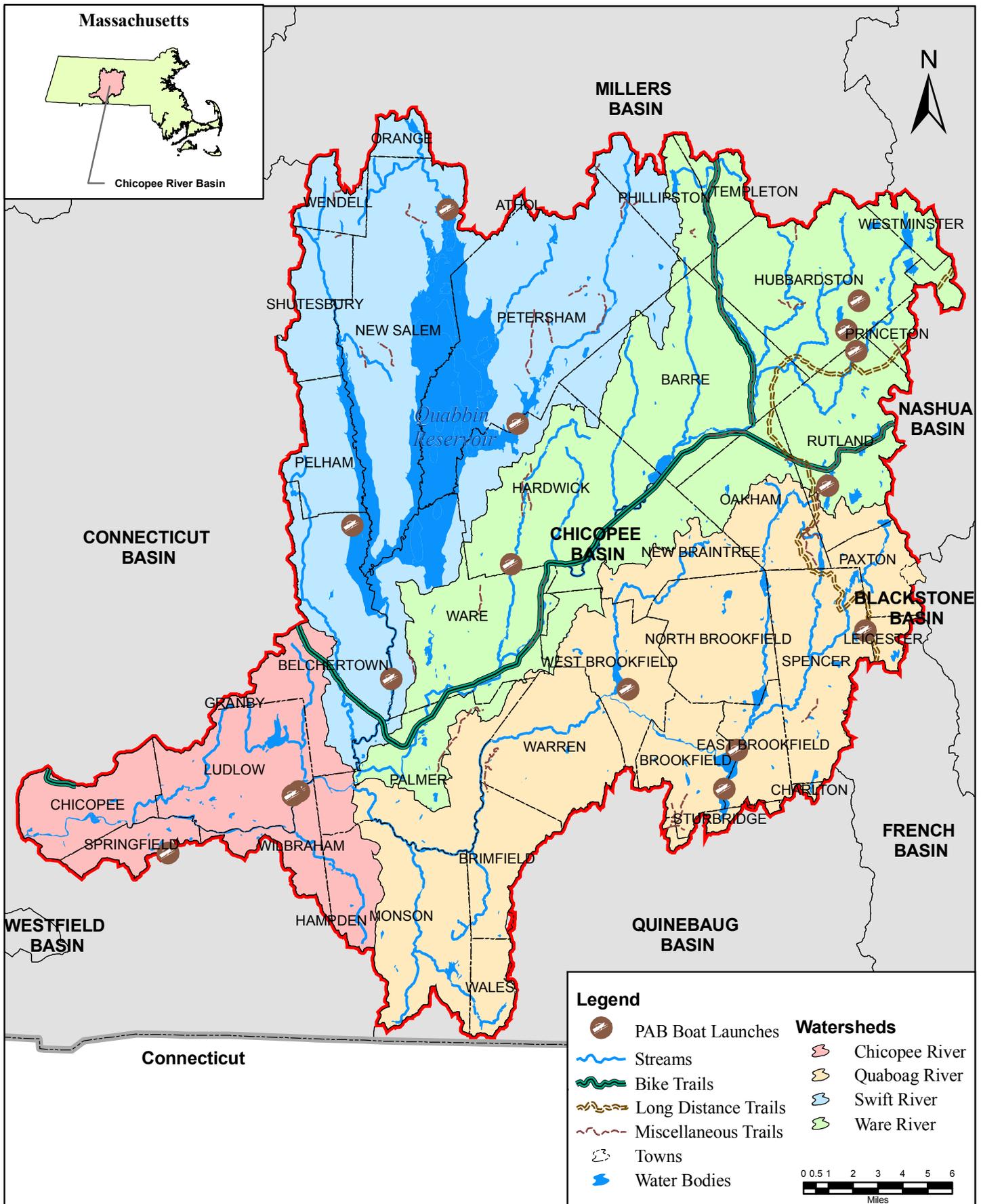
Priority Actions:

- Increase and maintain public access sites along water bodies (e.g., canoe launches), the quantity of bike trails, and the number of public camping opportunities throughout the Basin.

⁵ Protection of open space was listed as an objective in [Section 2.2.2](#), but would also increase the quantity and quality of recreational opportunities as well.

- Increase enforcement of motorized watercraft and ATV violations and misuse
- Increase quantity and quality of interpretative materials in recreational areas
- Investigate and designate appropriate roads/trails as scenic areas

Figure 2.5.1-1. Location of PAB Boat Launches and Various Trail Networks within the Chicopee River Basin



3.0 ACTION MATRIX

The following matrix lists the goals, objectives, and priority actions described in the previous section⁶. In addition, the proposed partners for undertaking each action, potential sources for funding, and the relative priority rankings are indicated (a rank number of 1 indicates the highest priority for action). An attempt was made to identify the most relevant sources of funding for each action; however, other sources identified within this document ([Section 4](#)) and outside the document may also be relevant. Moreover, in some cases, the agency or entity proposed as the lead party may be able to conduct the action as part of its operating budget and/or through the use of volunteers.

Action Strategy	Potential Partners	Priority	Potential Funding
Goal: Protect and Improve Water Quality			
<i>Objective: Protect surface water and groundwater drinking supplies</i>			
Assist municipalities to plan for and protect future surface water and groundwater drinking supplies through a process of integrated water resources planning	EOEA, MDEP, EPA, LGEAN, MDHCD, NRCS, USGS, town planning boards	1	5, 6, 9, 11, 15, 27, 28, 29, 30, 31, 33, 34, 35, 52, 53, 54, 61
Evaluate impacts of landfills on water quality and implement landfill BMPs where needed -- [Ware and Quaboag watersheds]	MDEP, towns, landfill owners	3	27, 28, 29, 31
<i>Objective: Identify and reduce CSOs and nonpoint source pollution</i>			
Continue to support state and federal agencies, and planning commissions to identify and reduce CSOs	MDEP, EPA, PVPC, MRPC, CMRPC, FRCOG, NRCS	1	3, 9, 18, 27, 29, 34, 54, 57, 61
Better coordinate sampling between existing federal, state, and local sampling efforts	MDEP, MDCR, EPA, NRCS, watershed and lake associations	1	9, 32, 54, Operating Budget
Continue water quality monitoring at MDEP's present sampling locations and expand sampling to assess priority waters identified in the Nonpoint Source Action Strategy for the Chicopee River Basin (MDEP, 2003)	MDEP	1	32, Operating Budget
Reduce phosphorous levels in those lakes identified as having high values in the document entitled, <i>Total Maximum Daily Loads of Phosphorous for Selected Chicopee Basin Lakes</i> (MDEP, 2002) and support the implementation of the total phosphorous TMDL for Quaboag and Quacumquasit Ponds (MDEP, 2005) -- [Chicopee and Quaboag watersheds]	MDEP, MDCR, EPA, MHFA, COLAP, NRCS, MWC, local towns, Riverways, MassHighways	1	9, 24, 27, 28, 32, 38, 47, 53, 57

⁶ Sub-actions that were listed under individual priority actions in [Section 2](#) are not listed in the Action Matrix. For more information on these actions, please refer to [Section 2](#).

Action Strategy	Potential Partners	Priority	Potential Funding
Identify existing Best Management Practice (BMP) documents and distribute them to Planning Boards, Boards of Selectman, Conservation Commissions and Highway Departments. Encourage the implementation of agricultural, urban/runoff, and residential BMPs to reduce anthropogenic impacts on surface and groundwater quality. In the near term, particular interest should be paid toward those areas that have been identified as having high pollutant loads as well as areas that are beginning to show degradation	EOEA, MDEP, EPA, MDAR, COLAP, NRCS, local towns, conservation commissions, watershed associations, farmers, foresters	2	3, 9, 11, 20, 21, 22, 27, 28, 31, 32, 47, 49, 50, 51, 53, 54
Continue follow-up sampling and remediation activities for the seven tributaries identified as having high pollutant load scores in the Assessment Report (EOEA, 2003) -- [Chicopee and Quaboag watersheds]	MDEP	3	57, 28
Support efforts to address MDEP's river segment and lake water quality recommendations identified in the most recent Water Quality Assessment Report. Please note, not all of the recommendations from the <i>1998 Water Quality Assessment Report</i> (see Appendix I) were listed as priority actions in this report, as they are due to be updated by a more recent water quality assessment of the Basin, which was not available for consideration in the WAP.	EOEA, MDEP	N/A	N/A
<i>Objective: Assist municipalities with water resource planning and sustainable development to improve water quality</i>			
Implement recommendations identified by PVPC in the <i>Chicopee River Watershed Basin Assessment</i> (PVPC, 2004), especially those related to public education, water quality sampling, and better construction and maintenance of stormwater BMPs -- [Chicopee watershed]	MDEP, PVPC, MDHCD, NRCS, towns in Chicopee watershed	1	17, 27, 28, 35, 47, 53, 57, 61
Encourage sustainable residential planning and develop model bylaws for municipalities to use to govern nonpoint source pollution and erosion	EOEA, EPA, LGEAN, MDHCD, NRCS, town planning boards	2	5, 6, 10, 15, 28, 29, 35, 39, 52, 54
Assist municipalities, wastewater districts, and public water supplies in efforts to comply with federal and state requirements relating to water quality protection. This may require the construction of new facilities and/or improvement of existing facilities.	MDEP, EPA, wastewater districts and water suppliers	2	9, 16, 27, 30, 31, 61
<i>Objective: Improve condition of storm water infrastructure, monitoring frequency, and maintenance frequency</i>			
Promote and fund an increased frequency of catch basin and street cleaning, and construct deeper catch basins and/or improve existing catch basins within urban areas (ESS, 2001). Also investigate emerging technologies to replace catch basins with more effective methods of dealing with runoff.	EOEA, MDEP, towns	2	17, 27, 28, 61
Goal: Protect Aquatic Resources and Freshwater Biodiversity			
<i>Objective: Increase the collection and analysis of data pertaining to biological resources and habitats</i>			

Action Strategy	Potential Partners	Priority	Potential Funding
Evaluate the affects of flow management practices on streamflows and corresponding water quality problems identified by MDEP (2001) in the upper Ware watershed -- [Ware watershed].	MDEP, MDFW, USFWS, TU, Dam owners, Riverways	1	12, 32, 57
Investigate and control the spread of non-native aquatic and wetland vegetation	MDEP, MDCR, COLAP	1	24, 28, 32, 57
Evaluate the effects of hydroelectric dams on streamflow and habitat conditions (MDEP, 2001 , PVPC, 2004) -- [Chicopee and Ware watersheds]	FERC, USFWS, Hydro owners, MDFW, MDMF, NRCS, TNC, TU	3	12, 32, 42, 43, 44, 45, 46, 47, 57, 58
<i>Objective: Identify impassible barriers, such as dams and culverts, and consider upstream/downstream fish passage where applicable</i>			
Evaluate the need for and increase upstream and downstream fish passage for diadromous fish species. Initially emphasis should be placed on the Dwight Dam (i.e., the lowermost dam on the Chicopee River). Fish passage triggers should be established at the Dwight Dam to determine when fish passage is required at subsequent upstream dams -- [Chicopee watershed]	MDMF, FERC, USFWS, NOAA, NRCS, Hydro owners, TNC, TU, watershed associations	2	12, 13, 41, 42, 43, 44, 45, 46, 56, 58, 59
<i>Objective: Assess potential threats, management, and restoration needs for Living Waters Core Habitats and Critical Supporting Watersheds</i>			
Increase collection of information with regard to rare species and ecologically sensitive aquatic habitats (e.g., rare species surveys, freshwater mussel surveys, certification of vernal pools, etc.)	NHESP	2	Operating Budget
Increase stream assessments and restoration activities	Massachusetts Riverways Program, MDEP, MDFW, NRCS, USFWS, towns, lake and watershed associations	2	1, 12, 18, 53, 54, 55, 56, 57, 60
<i>Objective: Protect Open Space and ecologically sensitive habitats</i>			
Assist municipalities with open space protection and growth management/protection. Particular emphasis should be placed on protecting <i>Living Waters</i> Core Habitats and Critical Supporting Watersheds. Emphasis should also be placed on preserving the rural character in fast-growing communities including preservation of farmland and forests	EOEA, NHESP, MDCR, Massachusetts Riverways Program, MDAR, NRCS, towns, farmers, foresters	1	4, 5, 6, 7, 8, 11, 14, 19, 22, 24, 26, 32, 47, 49, 50, 51, 53, 54, 55, 56
Goal: Increase Environmental Knowledge and Access to Environmental Resources			
<i>Objective: Facilitate the structuring and access to environmental information</i>			
Develop an environmental information system for the Chicopee River basin to	WPI, MDEP, MDCR,	1	9, 11, 17, 35

Action Strategy	Potential Partners	Priority	Potential Funding
house environmental reports, data, and data collection standards. This system could start as a pilot project within select communities and then be gradually expanded throughout the Basin.	EPA, MDHCD COLAP, MWC, USGS, MBOH, Riverways, towns		
<i>Objective: Reduce data gaps through increased environmental monitoring and consistency of data collection</i>			
Existing data collection efforts should continue, and new efforts should be initiated to identify data gaps and reduce them through increased environmental monitoring. Efforts should also be made to increase the quality of data collection through adopting and distributing standards to volunteer groups collecting environmental information throughout the Basin.	MDEP, MDCR, MDFW, EPA, towns, COLAP, MDFW, watershed associations	2	11, 12, 32, 54, 57
<i>Objective: Increase public outreach and education</i>			
Continue with efforts to educate the public e.g., “Do more outreach, more frequently and to more people” (EOEA, 2003). For example, interviews with representatives from the Basin on public cable networks as well as in local newspapers would be an effective way to reach people and to educate them on the Basin’s ecology, environmental issues, activities that are taking place, and how citizens can participate. Awards could also be issued to towns that are actively engaging in BMPs to generate awareness of measures that the towns and concerned citizens can take to reduce their impact on the environment.	EOEA, MDEP, MDCR, MDAP, EPA, towns, COLAP, USGS, MWC, MBOH, conservation commissions, watershed associations	1	9, 10, 17, 18, 26, 28, 39
Educate local conservation commissions to enable them to monitor, and enforce public works and highway maintenance activities; municipalities should also be encouraged to educate their employees on environmental management practices through peer workshops. For example, members of the public believe that greater “buy-in value” would be achieved among departments of public works and highway departments if they were educated by their peers through peer workshops rather than receiving training from outside entities.	EOEA, MDEP, EPA, NHESP, MHD, conservation commissions, MassHighways, town DPWs	2	9, 11, 17, 37
Support the development of an environmental education center	EOEA, local towns	2	17
Increase opportunities for student involvement in assessing the Basin’s environmental condition and needs	EOEA, MDEP, MDOE, Universities, science educators, towns	2	17
Goal: Build Stakeholder Capacity			
<i>Objective: Increase the capacity of municipalities and local organizations in assessing the Basin’s environmental condition and needs</i>			
Support grassroots efforts such as the Massachusetts Congress of Lake and Pond Associations, Inc. (COLAP) to start new lake associations and to build capacity of existing lake associations. Also, support the development of new	EOEA, COLAP, MWC	1	28, Operating Budget

Action Strategy	Potential Partners	Priority	Potential Funding
watershed associations and build capacity of existing watershed associations. This will enable them to effectively collect, monitor, and report environmental information and to educate the public on their efforts.			
Provide municipalities with environmental education, model bylaws and regulations, and resources to encourage pro-active and environmentally sound watershed management	EOEA, MDEP, MDCR, PVPC, MRPC, CMRPC, FRCOG, municipalities	1	17
Provide training or other assistance to enable Conservation Commissions to identify, document and pass on information about rare species and significant habitats in their communities to appropriate state offices (e.g., the NHESP)	NHESP, conservation commissions	3	17, Operating Budget
Goal: Enhance Recreational Opportunities			
<i>Objective: Increase law enforcement of misuse</i>			
Increase enforcement of motorized watercraft and ATV violations and misuse	Massachusetts Environmental Police, Local harbormasters, police	2	Operating Budget
<i>Objective: Increase the number of outdoor recreational opportunities and associated educational benefits</i>			
Increase and maintain public access sites along water bodies (e.g., canoe launches, disabled fishing access, etc.), the quantity of bike trails, and the number of public camping opportunities throughout the Basin.	PAB, MDCR, MRPA, MHD, local recreation commissions, towns	2	8, 23, 24, 25, 37, 62
Increase quantity and quality of interpretative materials in recreational areas	EOEA, MDCR, MRPA	3	8, 25
Investigate and designate appropriate roads/trails as scenic areas	MDCR, PVPC, MRPC, CMRPC, FRCOG	3	8, 23

4.0 POTENTIAL FUNDING SOURCES

The following list of potential funding sources lists a selection of grants, loans and other funds that are available to agencies, municipalities, non-profit organizations and concerned citizens. Please note that funding availability changes periodically; therefore, some funding opportunities identified in this list may not be available at the present time, but may become available again in the future. Moreover, there are other funding opportunities available that have not been identified in this document.

All actions listed in this document are eligible for funding through EOEAs Watershed Improvement Grants (summarized below); all other grants and funding opportunities are presented alphabetically and linked to the Action Matrix via the numbering scheme.

EOEA – Watershed Improvement Grants

Contact: Vandana Rao, (617) 626-1248, vandana.rao@state.ma.us

Summary: EOEAs provides funding through this grant to complete projects designed to achieve the restoration and preservation of water and/or land resources, consistent with EOEAs Watershed Action Plans.

Eligibility: Open to public and private entities, but projects must have been cited in an EOEAs-accepted Watershed Action Plan.

1. American Sportfishing Association's FishAmerica Restoration Grants

NOAA partners with FishAmerica to fund marine and anadromous fish habitat restoration projects which benefit recreationally fished species around the coastal U.S. During open announcements, applications should be directed to the FishAmerica Foundation. FishAmerica requests that applicants strive for a 1:1 non-federal match (cash or in-kind) on project proposals.

Contact: Johanna Laderman

<http://www.fishamerica.org/faf/grants/index.html>

Closing February 25, 2005

2. Boat U.S. Foundation – Clean Water Grants

Contact: Joni Turken, Grant Administrator, e-mail: JoniT@BoatUS.com

Summary: In 1998, the Foundation launched the Clean Water Grants Program to support community-based boater education and hands-on efforts aimed at cleaning up our waterways. Grants up to \$2,000 are awarded to groups nationwide for one-year projects. Emphasis will be placed upon funding innovative ways to reach boaters and anglers with positive messages about preventing pollution before it starts.

The Clean Water Grants Program is designed to fund projects that educate boaters about environmental stewardship, or that inform the public of related events or programs. Projects should reflect a unique and repeatable way to reach the public with clean water messages. Allowable expenses may include artwork, printing, mailing, educational materials, construction materials, etc.

The grant recipient is not required to provide matching funds. However, the Foundation requires that its grant represent at least 50% of a project's budget. Proposals that include in-kind donations of product and/or time are encouraged. A grantee must keep accurate accounting records and must maintain the reporting schedule as specified in the grant agreement. Surplus funds are to be returned to the Foundation unless otherwise authorized.

Eligibility: volunteer boating groups, clubs, and associations, local non-profit/tax-exempt organizations, including chapters of national organizations

Schedule: Check the following website for updates: <http://www.boatus.com/cleanwater/grants/>

3. Community Septic Management Program

Contact: Central Regional Office:

Joanne Kasper-Dunn (508) 792-7653 x3763, e-mail: joanne.kasper@state.ma.us

Western Regional Office:

Deirdre Cabral (413) 784-1100 x2148, e-mail: deirdre.cabral@state.ma.us

Summary: Loans for septic system planning and improvements.

Eligibility: Municipalities

Match: None

\$ Range: This program has already undergone two rounds of funding. Every community was given a chance to participate during the years 1996-1998. Currently available option: possible grant (up to \$15,000) to develop a regional or watershed based septic system management plan. Upon completion of the plan the municipality would receive a minimum \$200,000 loan for upgrades. If the community is already participating in the program, and can demonstrate a need for additional funds, then the Regional Coordinator must be contacted through an "Expression of Interest".

Schedule: For new applicants: A two page "Expression of Interest" is required. Call the Regional coordinator for the current schedule.

4. Corporate Wetland Restoration Partnership

Contact: Susan Redlich, CWRP Manager (617) 287-5568; e-mail: susan.redlich@umb.edu

<http://www.mass.gov/czm/wrp/index.htm>

Summary: The Massachusetts Corporate Wetlands Restoration Partnership (MA-CWRP) is a voluntary public-private partnership to restore degraded freshwater and coastal wetlands in Massachusetts. Under the direction of the MA-CWRP Board, private contributions of funds and technical services are targeted for the restoration of wetland sites and aquatic habitats that have been degraded by fill, restricted water supply, non-point source pollution, and dams. Donated funds and services can often attract matching federal and/or state funds at a favorable ratio, for example, 3:1. Massachusetts CWRP Partners include private sector firms, the Massachusetts Executive Office of Environmental Affairs (EOEA), the federal office of the Coastal America Partnership (representing 13 federal departments and agencies), non-profit organizations, and academia. The Gillette Company, EOEA, and the federal EPA launched CWRP in 1999. As of March, 2004, a total of 44 companies have joined as CWRP partners, voluntarily contributing over \$1,000,000 in funds and in-kind services. The MA-CWRP is an unincorporated association, independent of state government.

Examples: Typically, environmental agencies bring priority restoration project options before the CWRP Board. The Board approves projects for contributions of funding and/or services to the Coastal America Foundation, a 501 (c) (3) organization. All types of wetland restoration projects are eligible including inland and coastal wetland habitats that have been degraded or destroyed. Examples of project objectives include excavation and removal of fill, channel and culvert improvements, storm water discharge treatment, and replanting of vegetation. Contributions of in-kind services are managed by the Wetlands Restoration Program and the Riverways Program within EOEA.

Schedule: Proposals for Wetland Restoration Projects are solicited via the Comm-PASS web site (<http://www.comm-pass.com/>)

5. EOEA-Massachusetts Executive Order 418-Community Development Planning

On January 21, 2000, Governor Paul Cellucci and Lieutenant Governor Jane Swift issued Executive Order 418, a measure designed to help communities plan for new housing opportunities while balancing economic development, transportation infrastructure improvements and open space preservation. Executive Order 418 directs the Department of Housing and Community Development, the Executive Office of Environmental Affairs, the Executive Office of Transportation and Construction and the Department of Economic Development to provide assistance to cities and towns for community planning. The order makes available up to \$30,000 in planning services to each of the 351 cities and towns in Massachusetts for the creation of a Community Development Plan.

6. EOEA-Planning for Growth Grants

Contact: Kurt Gaertner: (617) 626-1154 or kurt.gaertner@state.ma.us

Summary: Comprehensive growth planning for cities and towns and development of regional policy plans.

Eligibility: Municipalities and regional planning agencies.

Match: 25%, can be cash or in-kind.

\$ Range: Up to \$100,000.

Examples: \$80,000 to the towns of Buckland and Shelburne for the completion of an inter-municipal comprehensive plan. \$50,000 to the Berkshire Regional Planning Commission and the Towns of Lee and Lenox for development of a sub-regional growth policy plan.

Schedule: Call for more information.

7. EOEA-Self Help Program

Contact: Jennifer Soper: (617) 626-1015 or jennifer.soper@state.ma.us

Summary: Funds for acquiring land for conservation and passive recreation purposes.

Eligibility: Municipal Conservation Commissions (A town must have a state approved Open Space and Recreation Plan to be eligible).

Match: 52 70% grant of total project cost: level of funding dependent upon the equalized valuation per capita decile ranking of the community. Please note that this is a reimbursement program, not a matching grants program.

\$ Range: The Secretary of EOEa announces Maximum Grant award amount at the onset of each grant round.

Examples: Award to Falmouth to purchase coastal pond property adjacent to larger conservation area.

Schedule: The application process begins in the spring with an application deadline of June 1. A new rolling grant round is in development and will be announced by the Secretary of EOEa. Call for more information.

8. EOEa-Urban Self Help Program

Contact: Joan Robes: (617) 626-1014 or joan.robres@state.ma.us

Summary: Funds for acquiring land for public outdoor recreation and/or the renovation or development of public outdoor park and recreation facilities.

Eligibility: Municipalities: Town and cities must have a state approved Open Space and Recreation Plan to be eligible.

Match: 52 70% grant of total project cost: level of funding dependent upon the equalized valuation per capita decile ranking of the community. Please note that this is a reimbursement program, not a matching grants program.

\$ Range: The Secretary of EOEa announces Maximum Grant award amount at the onset of each grant round.

Examples: Funds to the City of Cambridge to convert Danehy Park from a 50 acre landfill to playing fields and open space.

Schedule: The application process begins in the spring with an application deadline of June 1. A new rolling grant round is in development and will be announced by the Secretary of EOEa. Call for more information

9. EPA on-line catalog of Federal funding sources for watershed protection

(<http://www.epa.gov/ogd/index.htm>)

The Catalog of Federal Funding Sources for Watershed Protection Web site is a searchable database of financial assistance sources (grants, loans, cost-sharing) available to fund a variety of watershed protection projects.

Also visit <http://www.epa.gov/owow/watershed/funding.html#wastedrink> for watershed funding opportunities.

10. EPA-Sustainable Development Challenge

One Congress St, Boston, MA 02114

888-372-7341- www.epa.gov/region01/eco/grants/sustaing.html

Aims to encourage communities to work with businesses and government to develop flexible, locally-oriented approaches that link environmental quality management with sustainable development and revitalization. An example is working with local businesses to develop a comprehensive system for solid waste reduction/reuse/recycling in conjunction with rehabilitating buildings, facades, streetscapes, etc.

11. EPA – Targeted Watershed Initiative

Contact: Rick Hopkins, 802-241-3770 rickh@dec.anr.state.vt.us

<http://www.epa.gov/owow/watershed/initiative/2005/2005grantsolicit.html>

Summary: The Targeted Watersheds Grant Program is a relatively new EPA program designed to encourage successful community-based approaches and management techniques to protect and restore the nation's waters. The watershed organizations receiving grants this year exhibited strong partnerships with a wide variety of support; creative, socio-economic approaches to water restoration and protection; and explicit monitoring and environmentally-based performance measures.

Eligibility: Nominations must be submitted by a governor or tribal leader. States and tribes may prepare or solicit watershed nominations in a manner most appropriate to their state and submit the best to EPA. Watershed organizations interested in pursuing a Targeted Watersheds grant should contact their state or tribe as soon as possible to ascertain its internal procedures. Governors and tribal leaders are limited to two watershed nominations within their jurisdiction. However, to encourage interstate efforts, they may nominate an unlimited number of watersheds that cross state, tribal, or national boundaries.

\$ Range: usually \$600,000 - \$900,000 (25% non-federal match required)

Schedule: Applications due May 12, 2005.

12. Fish America Foundation

Contact: (703) 519-9691 or fishamerica@asafishing.org

Summary: Provides funding to non-profit organizations such as sporting clubs, civic associations, conservation groups, and state agencies.

Eligibility: The applicant must be a non-profit organization.

\$ Range: \$7,500 (Conservation), \$15,000 (Research)

Schedule: Grant Applications are due on July 31.

13. FWS National Fish Passage Program

The Fish Passage is a voluntary program that reconnects fish species to historic habitats. Project funding is for fish passage restoration by removing or bypassing barriers to fish movement. Primary project types include dam removal, culvert renovation, designing and installing fishways, installing fish screens and barrier inventories to identify additional fish passage impediments. Proposals requesting between \$1,000 and \$50,000 are most attractive. There is no required match; however a 50 percent cost-share is highly encouraged.

Contact: David Perkins (413)253-8405 david_perkins@fws.gov

Open Ongoing

14. FWS Private Stewardship Grant Program

FWS announced on Jan. 18 that its regional offices are accepting proposals for private lands conservation funding through its Private Stewardship Grants Program. About \$6.5 million is available in FY 2005 to support on-the-ground conservation efforts on private lands.

As envisioned by President Bush, this program provides Federal grants on a competitive basis to individuals and groups engaged in voluntary conservation efforts on private lands that benefit imperiled species including federally listed endangered or threatened species as well as proposed, candidate and other at-risk species. Landowners and their partners may submit proposals directly to the Service for funding to support those efforts. http://endangered.fws.gov/grants/private_stewardship/index.html

Proposals due March 21, 2005

15. Local Government Environmental Assistance Network (LGEAN)

The Local Government Environmental Assistance Network (LGEAN) is a "first-stop shop" providing environmental management, planning, funding, and regulatory information for local government elected and appointed officials, managers and staff. Links to several funding opportunities are available.

See LGEAN website for specific funding deadlines: <http://www.lgean.org/html/whatsnew.cfm>

16. Massachusetts Drinking Water State Revolving Fund Program

Contact: Steven McCurdy (617) 292-5779, e-mail: steven.mccurdy@state.ma.us or Donovan Bowley (617) 292-5523, e-mail: donovan.bowley@state.ma.us

Summary: In an effort to provide incentive to communities to undertake projects with meaningful public health benefits, this program provides financial assistance to help municipalities and public water suppliers to comply with federal and state Safe Drinking Water Act requirements. The Program provides low-interest loans to finance construction or improvement of water treatment facilities, as well as enhancement to distribution systems.

Eligibility: Massachusetts municipalities and community water systems with at least 15 residential connections.

Match: None

\$ Range: For calendar years 1998-2003, up to \$400 million may be available through the loan program.

Examples: Projects include: New and upgraded drinking water treatment facilities; projects to replace contaminated sources, new water treatment, or storage facilities; consolidation or restructuring of water systems: project and system activities that provide treatment, or effective alternatives to treatment, for compliance with regulated health standards, such as the Surface Water Treatment Rule, installation or replacement of transmission or distribution systems.

Schedule: Applications are accepted annually in the late summer / early fall. Call for more information.

17. Massachusetts Environmental Trust Environmental Grants

Contact: Robin Peach: (617) 727-0249

Summary: The Trust funds projects that: (1) encourage cooperative efforts to raise environmental awareness, and (2) support innovative approaches that can protect and preserve our natural resources, with a special focus on water and related land resources.

Eligibility: Non-profit, community associations, civic groups, schools and institutions for higher education, municipalities, and state agencies.

Match: See individual program guidelines.

\$ Range: See individual program guidelines.

Examples: Recipients have included the Coalition for Buzzards Bay, Springfield Science Museum, Pioneer Valley Planning Commission, Association for the Preservation of Cape Cod, and many others.

Schedule: Annual Request for Response is available on October and Letters of Inquiry are due in December. All program guidelines are available on the Trust's web site. <http://www.agmconnect.org/maenvtr1.html>.

18. Mass Riverways-Urban Rivers Small Grants

Contact: Joan Kimball: (617) 626-1544 or joan.kimball@state.ma.us

Summary: For projects that seek to restore urban rivers.

Eligibility: Municipalities and non-profit groups located in urbanized areas.

Match: No match requirement.

\$ Range: \$3,000 - \$8,000

Examples: First year grants.

Schedule: Call for more information.

19. MDAR-Agricultural Preservation Restriction Program

Contact: Richard M. Chandler: (413) 577-0459, e-mail: rchandler@umext.umass.edu

Summary: The APR Program is a voluntary program which is intended to offer a non-development alternative to farmers and other owners of "prime" and "state important" agricultural land who are faced with a decision regarding future use and disposition of their farms. Towards this end, the program offers to pay farmers the difference between the "fair market value" and the "agricultural value" of their farmland in exchange for a permanent deed restriction which precludes any use of the property that will have a negative impact on its agricultural viability. The state's investment in the APR Program benefits farmers, the state's agricultural industry, the state and local economies, consumers and the general populace in a number of important ways.

- The program works to bolster the state's \$532,000,000 agricultural industry by helping to keep farms in active commercial use, and by sending an important signal to the industry and its farmers that Massachusetts is serious about encouraging a strong and viable agricultural economy.
- Farmers whose land is accepted into the program are able to realize equity from their land without being forced to sell their farms for development purposes. The equity is often reinvested back into the protected farm by way of the purchase of more land, equipment or buildings and through the retirement of farm debt.
- A major portion of APR participants spend all or most of their APR funds locally, thereby creating a link between private and public benefit, and adding credence to the assertion that APR monies benefit more than just individual farmers and, in reality, work to stimulate local and state economies.
- The APR Program often represents the only means by which farmers are able to plan their estates to allow for the transfer of ownership of their farms to their children. By reducing the value of restricted farmland to its agricultural value, gift or inheritance taxes can be greatly reduced, thereby eliminating the need for second generation farmers to sell their farmland in order to pay taxes.
- APR restricted farmland represents an opportunity for young farmers just entering the business and other farmers in need of additional land to purchase affordable farmland. The program serves to stabilize farmland values and guarantee the long-term availability of farmland. This factor is especially important in areas with escalating land values and is critical for farmers who rent a large percentage of the land that they farm.
- By protecting farmland, the APR Program works to secure a continued high quality of life for Massachusetts residents. Farmland not only contributes to the scenic beauty of the state, but it provides for clean air and water, wildlife habitat, and recreational opportunities.

Eligibility: Farm must be at least five (5) acres in size. Land has to have been actively devoted to agriculture for the two (2) immediately preceding tax years. At least \$500 in gross sales per year plus \$5 for each additional acre or 50 cents per each additional acre of woodland and/or wetland. Other criteria staff weigh when considering potential APRs include: Suitability and productivity of land for agricultural use based on soil classification, physical features, location; The degree of threat to the continuation of agriculture on the land due to circumstances such as owner's death, retirement, financial difficulties, development pressure, or insecurity due to rental agreements; and The degree to which the land is of a size or composition to be economically viable for agricultural purposes and the likelihood that it will remain in agriculture for the foreseeable future.

Examples: Since 1980, deed restrictions have been placed on 468 farms totaling approximately 42,000 acres in 130 towns.

Schedule: The program is a rolling application process. If a farmer is interested, the APR Program should be contacted.

20. MDAR-Agriculture Environmental Enhancement Program

Contact: Susan Phinney, Boston (617) 626-1772, e-mail: susan.phinney@state.ma.us

Summary: This program is open to producers and growers who farm 5 acres or more in the state of Massachusetts and have the potential to impact water resources. This program reimburses farmers for the cost of their materials for projects that aim to improve water quality. The farmer is responsible for the cost of installing and maintaining the practice.

Eligibility: Farmers owning farms 5 acres or larger. All applicants must have either an updated USDA Natural Resource Plan or a plan from an approved source such as the one in the “On-Farm Strategies to Protect Water Quality” workbook which can be obtained by calling the Massachusetts Department of Agriculture.

\$ Range: The maximum award per project is \$20,000. Up to 75% of the cost will be reimbursed prior to the project’s completion for projects over \$5,000.

Schedule: Annual Request for Response (RFR) is issued in August. Please call for more information.

21. MDAR-Farm Viability Enhancement Program

Contact: Craig Richov, (617) 626-1725, e-mail: Craig.Richov@state.ma.us

Summary: This program's purpose is to improve the economic bottom lines and environmental integrity of participating farms through the development and implementation of Farm Viability Plans. These comprehensive, yet focused farm plans, which are to be developed by teams comprised of farmers and other agricultural, economic and environmental consultants, will be aimed at suggesting ways for farmers to increase their on-farm income through such methods as improved management practices, diversification, direct marketing, value-added initiatives and agritourism. In addition, the Plans will make recommendations concerning environmental and resource conservation concerns on participating farms. Financial agreements are made with participating farms upon the completion of such a plan which may include either the purchase of an agricultural covenant by the state for a term of 5 or 10 years, or payment for the implementation of the developed Farm Viability Plan.

\$ Range: Technical assistance and the development of business plans are provided at no cost to the farmer. Farmers who are then willing to sign a non-development restriction covenant are eligible to receive funding. Up to \$20,000 is available for farmers willing to agree to a covenant for a period of five years. Up to \$40,000 is available to farmers willing to agree to a ten year covenant. An award of up to \$60,000 may go to farmers with at least 135 acres, agreeing to a ten year covenant, and meeting certain criteria in their business plans regarding the potential to increase net farm income and to retain or increase the number of farm jobs.

Eligibility: To be eligible for participation in the Program, an applicant must own, or be a co-applicant with the owner of, at least 5 acres of land in agricultural use.

Schedule: Applications are accepted in the spring. Call for more information.

22. MDCR-Forest Stewardship Program

Contact: Susan Campbell (413) 256-1201 or susan.campbell@state.ma.us

Summary: Grants to private forest landowners to protect forest ecosystems. Landowners, with assistance of MDCR foresters, develop a forest stewardship plan for their property, which makes them eligible for Federal cost sharing funds to help carry out the plan.

Eligibility: Any forest landowner in Massachusetts, who meets the following criteria: ownership must be private, non-industrial, and non-profit; and forest land must be less than 1,000 acres in total size in the State.

Examples: Forest stewardship plans and implementation can include any project which meets one of the 9 main goals, such as wildlife habitat management, erosion reduction, protection of endangered species, trail creation/maintenance, and timber quality improvement.

Schedule: Applications were due in March of past years.

23. MDCR-Greenways and Trails Demonstration Grants

Contact: Jennifer Howard: (413) 586-8706 X18; email jennifer.howard@state.ma.us

Summary: Innovative projects that advance the creation and promotion of greenway and trail networks throughout Massachusetts.

Eligibility: Municipalities, regional planning agencies, and non-profit organizations.

Match: None required, although encouraged, including in-kind contributions.

\$ Range: \$1,000 - \$5,000; up to \$10,000 available for multi-town projects.

Examples: Improving access to rivers and trails, producing greenway and trail brochures, maps, signs, and curricula, and involving community members in greenway and trail planning and implementation.

Schedule: Applications are due in fall/winter each year - call for more information.

24. MDCR-Lake and Pond Grant Program

Contact: Steve Asen: (617) 626-1353 or steve.asen@state.ma.us

Summary: Lake and Pond protection, preservation, enhancement, and public access.

Eligibility: Municipalities; co-applications are encouraged from Lake and Pond Associations or Districts, and Watershed Associations.

Match: 50% cash match.

\$ Range: \$1,000-\$10,000

Examples: Controlling non-point pollution; eradicating non-native aquatic plant species, developing lake and watershed management plans.

Schedule: In past years, applications were mailed in October and the deadline was December 31. Call for more information.

25. MDCR-Recreational Trails Program

Contact: Peter Brandenburg: (617) 626-1453 or peter.brandenburg@state.ma.us

Summary: Construction and improvement of publicly accessible recreational trails.

Eligibility: Municipalities, non-profit groups, and regional and state agencies.

Match: 20% minimum, in-kind permitted.

\$ Range: \$2000-\$20,000, exceptions considered.

Examples: Trail building materials; support of volunteer trail maintenance activities.

Schedule: Call for more information.

26. MDCR-Urban Forest Planning and Education Grants

Contact: Edith Makra: (617) 626-1466 or edith.makra@state.ma.us

Summary: Funds to build support for the protection and management of community trees and forest ecosystems.

Eligibility: Municipalities and nonprofit groups.

Match: 100%, in-kind allowed.

\$ Range: Up to \$10,000

Examples: Tree inventories that involve residents in data collection; hands on training to students to observe, plant and care for trees; workshops and public awareness campaigns; urban environmental analysis (GIS).

Schedule: Applications are due in mid-April. Call for more information.

27. MDEP-Massachusetts Clean Water State Revolving Fund Program

Contact: Steven McCurdy (617) 292-5779, e-mail: steven.mccurdy@state.ma.us

Summary: In an effort to provide incentive to communities to undertake projects with meaningful water quality and public health benefits, this program provides financial assistance to help municipalities and wastewater districts to comply with federal and state water quality requirements. The Program provides subsidized, low-interest loans to finance water quality improvement projects, with particular emphasis on watershed management priorities.

Eligibility: Massachusetts municipalities and waste water districts.

Match: None

\$ Range: Maximum applicants limited to 15-20% of annual program capacity. Annual capacity is approximately \$150 to \$200 million dollars.

Examples: Planning and construction of eligible projects, including new wastewater treatment facilities and upgrades of existing facilities; infiltration/inflow correction; wastewater collection systems; control of combined sewer overflows; and non-point source pollution abatement projects, such as landfill capping, community programs for upgrading septic systems (Title 5), and stormwater remediation.

Schedule: Solicitation annually during the summer.

28. MDEP-Section 319 Non-point Source Pollution Grants

Contact: Jane Peirce: (508) 767-2792, e-mail: jane.peirce@state.ma.us

Summary: To control non-point sources of water pollution, particularly from urban runoff, paved surfaces, and other areas where rainwater collects pollutants as it runs over the land.

Eligibility: Any interested public or private organization.

Match: 40% non-federal match of total project cost. In-kind services eligible for match.

\$ Range: \$20,000 to \$200,000

Examples: This program funds: sub-watershed and in-lake projects that address all major non-point sources affecting water quality in a waterbody; demonstrations of new or innovative best management practices (BMP's), technologies or institutional approaches to controlling non-point source pollution; groundwater projects that target high priority non-point source groundwater problems; and watershed resource restoration projects that restore vegetated wetlands, lakes, rivers, streams, estuaries, shorelines, riparian areas, seagrass beds and other aquatic habitats.

Schedule: An annual Request for Response (RFR) for project solicitation is issued around March 1, with proposals due to MDEP around May 1.

29. MDEP-Section 604(b) Water Quality Management Planning Grants

Contact: Gary Gonyea: (617) 556-1152, e-mail: gary.gonyea@state.ma.us

Summary: Water quality assessment and management planning.

Eligibility: Regional public comprehensive planning organizations such as: regional planning agencies, councils of government, conservation districts, counties, and cities and towns.

Match: Match not required but proposals are enhanced by demonstration of local support.

\$ Range: \$30,000 to \$60,000

Examples: Provide technical assistance to communities for water supply protection and assist local officials in comprehensive water resource planning.

Schedule: Request for Response is issued by MDEP each October for competitive projects with proposals due approximately six weeks later. Proposals are evaluated and funding is announced within two months of the proposal submission deadline. Generally, projects are expected to begin approximately eight months after the date of their selection by the MDEP.

30. MDEP-Source Water Protection Program

Contact: Kathleen Romero (617) 292-5727, e-mail: kathleen.romero@state.ma.us

Summary: This grant program provides funds to third party technical assistance organizations that assist public water suppliers in protecting local and regional ground and surface water supplies.

Eligibility: 1. Eligible applicants are third party organizations that have experience providing technical assistance related to drinking water protection. 2. Proposed work must benefit active drinking water sources. 3. The third party must submit letter(s) of support from the public water supplier(s) with the application.

Schedule: Request for Response is issued by MDEP each May for competitive projects with proposals due approximately eight weeks later.

31. MDEP-Well Head Protection Grant Program

Contact: Catherine Sarafinas (617) 556-1070, e-mail: catherine.sarafinas@state.ma.us

Summary: This grant program provides funds to assist public water suppliers in addressing wellhead protection through local projects and education.

Eligibility: Eligible applicants include all community public water systems, as well as non-transient non-community systems that serve schools. The grant recipient must be a public water system or municipality, and the grant must target an active public water supply source.

Examples: Zone I: Removal or upgrade of potential sources of contamination (for example, underground storage tanks, septic systems, salt storage), wellhead protection signs, and fencing in a pump house. Zone II: Interim wellhead Protection Area (IWPA): Land must be owned and controlled by water supplier or the municipality. Containment and improvement projects (secondary containment of liquid hazardous materials, salt/deicing storage, municipal waste management, drainage improvements and hazardous materials storage). Local town-wide inspection programs for floor drains, underground storage tanks, and hazardous materials.

Schedule: Request for Response is issued by MDEP each May for competitive projects with proposals due approximately eight weeks later.

32. MDEP-Wetlands and Water Quality Grant Program 104(b)(3)

Contact: Gary Gonyea: (617) 556-1152, e-mail: gary.gonyea@state.ma.us

Summary: This grant program is authorized under Section 104(b) (3) of the federal Clean Water Act. The goal of this program is to fund projects that address MDEP's water quality and wetland protection goals.

Eligibility: All Massachusetts Environmental Affairs agencies or other organizations with a co-sponsor are eligible. Non-profit organizations such as watershed associations, regional planning agencies, and universities are eligible to submit proposals but only through an EOEAs sponsoring agency.

Match: Proposals submitted must identify a 25% non-federal match (25% of Total Project Cost).

Schedule: Request for Response is issued by MDEP each January for competitive projects with proposals due approximately eight weeks later.

33. MDHCD-Community Development Action Grant (CDAG) Program

Contact: Carol Harper, Program Manager: (617) 727 7001 x483

Summary: This program provides primarily infrastructure support for projects promoting economic development. Project must demonstrate public benefit. CDAG funding limited to 50% of the total project cost; applicant must demonstrate financing commitments of public and private sources. CDAG funds the "minimum amount necessary to make the project feasible." All matching funds must be in place before CDAG funds can be expended.

Match: For each CDAG dollars, you need \$.50 local; and \$2.50 private.

\$ Range: \$100,000 to \$1,000,000.

Examples: Extension of water and/or sewer service to an industrial park. Road construction/improvement in industrial/commercial area with best management practices.

Eligibility: Municipalities only. These funds are to be utilized on public infrastructure projects and are intended to address substandard or blighted conditions. Land to be improved must be publicly owned. Pre application process, followed by full application.

Schedule: Rolling admission program. Call for more information.

34. MDHCD-Community Development Block Grant Program

Contact: Toni Hall, Community Development Specialist: (617) 727 7001, x428 Robert Shumeyko, Program Manager, (617) 727 7001, x 435

Summary: Support of community and economic development projects that benefit low and moderate income persons.

Funding: U.S. Department of Housing and Urban Development. DHCD administers competitive grant program for state's non entitlement communities (e.g., under 50,000 population).

Eligibility: Municipalities under 50,000 population, either individually or in regional arrangements. Contact DHCD for application.

Examples: Use rehabilitation (includes septic system repairs), water and sewer improvements, public facilities construction and improvements, e.g., parks and playgrounds, planning, economic development, neighborhood revitalization. List of eligible projects is extensive. Call for details.

Schedule: Application for Community Development Fund I and II were due on or before August 1 in past years. (Community Development Fund usually has one competitive round annually).

35. MDHCD-Municipal Incentive Grant Program

Contact: Don Martin, Program Coordinator: (617) 727 7001, x 404

Summary: The Municipal Incentive Grant Program (MIG) is designed to assist local government officials in the planning, management and operation of cities and towns, and in the training of local officials. The program provides grants to pay for consultant assistance and, in some cases, hardware and software. MIG funds enable communities, individually or working together, to address particular issues, define solutions and implement improvements in service delivery. Nonpoint source related plans may be eligible.

Eligibility: Must be a municipality, county government, or Regional Planning Agency. Maximum grants are \$35,000 for local and \$60,000 for regional projects.

Examples: Growth management strategies, affordable housing strategies, design of regional arrangements for service delivery, creation or enhancement of fiscal management practices, development of Geographic Information Systems (GIS).

Schedule: Call for more information.

36. MDR-Underground Storage Tank Program

Contact: Stuart Glass, Grant Manager (617) 887 5978 or stuart.glass@state.ma.us

Summary: This program, administered by the Massachusetts Department of Revenue and funded annually (up to 2 million dollars) by the Underground Storage Tank Petroleum Cleanup Fund (MGL c21J), provides municipal grants for the removal and installation of underground storage tanks.

Eligibility: Municipalities.

\$ Range: Grants can be up to 50% of eligible costs

Schedule: Applications are accepted annually in the early Fall. Call for more information or visit www.state.ma.us/ust.

37. MHD-Transportation Enhancement Funds

Contact: Linda Walsh: (617) 973 8052 or linda.walsh@state.ma.us

Summary: Funds for environmental remediation of transportation impacts; transportation improvements including pedestrian and bicycle pathways.

Eligibility: Municipalities apply through regional planning agencies.

Examples: Barnstable Walkway to the Sea (land acquisition for harbor access); stormwater remediation, best management practices, in Mashpee.

Schedule: Call for more information.

38. MHFA-Homeowner Septic Repair Loan Program

Contact: (617) 854-1020 or (617) 854-1333

Summary: Through a combined effort of the MDEP, the Massachusetts Department of Revenue, and the Massachusetts Housing Finance Agency, this program provides below market rates to homeowners upgrading septic systems.

Eligibility: Homeowner septic repair loans are available to eligible homeowners at low interest rates of 0%, 3%, and 5%, depending on income.

\$ Range: Homeowner loans range in size from \$1,000 to a maximum of \$25,000.

Schedule: Call for more information.

39. Municipal Recycling Grant Program

Contact: Brooke Nash: (617) 292 5984, e-mail: brooke.nash@state.ma.us or

Peggy Harlow (617) 292 5861, e-mail: peggy.harlow@state.ma.us

Summary: Recycling equipment, educational materials, and technical assistance grants

Eligibility: Municipalities and regional groups - must provide recycling data sheet and have municipal "Buy Recycled" policy.

Match: Recycling trucks (\$20,000 or trade in of old truck requested)

Replacement curbside set-out containers (50% match required)

Recycled paint (50% match required)

\$ Range: No restrictions: During FY 99 grants ranged from \$7- \$112,654

Examples: Recycling grant items include public education information, set out containers, roll off containers, recycling trucks, transfer trailers, hazardous household products equipment, recycled products, and technical assistance. New FY99 grant opportunities include storage sheds for collecting mercury-containing products, grants to pay for the recycling of electronics and mercury-containing products, technical assistance to increase participation in recycling programs.

Schedule: The application process begins in July and the submission deadline is in September.

40. Municipal Recycling Incentive Program (MRIP)

Contact: Brooke Nash: (617) 292 5984, e-mail: brooke.nash@state.ma.us or

Joseph Lambert: (617) 574-6875, e-mail: joseph.lambert@state.ma.us

Summary: Performance based grant that awards a per ton payment for primary recyclables collected through municipal programs.

Eligibility: Municipalities and regional groups - must meet minimum recycling criteria and elective criteria every 6 months (criteria are cumulative and increase every 6 months).

Match: None

\$ Range: During FY 98 payments ranged from \$76-\$124,649 (Based upon \$4/ton for drop-off programs and \$8/ton for curbside programs.)

Examples: During FY 99 minimum criteria included: establish a municipal "Buy Recycled" policy and tracking system; establish equal or "parallel" access to both solid waste and recycling collection services; expand recycling access to unserved residents. During FY 98 elective criteria included: Multiple choices in the areas of recycling access, recycling participation, and recycled product procurement.

Schedule: For past fiscal years, the first phase eligibility deadline was December and the second phase eligibility deadline was May. Call for more information.

41. NOAA/American Rivers Partnership

Contact: Jim Turek, (401) 782-3338 or James.G.Turek@noaa.gov

Laura Wildman, (860) 652-9911 or lwildman@amrivers.org

Summary: NOAA partners with American Rivers to fund projects that restore migratory fish habitat through dam removal and fish passage construction in California, the Northwest, the Northeast, and Mid-Atlantic regions. Project solicitation cycles are scheduled for April and November. Organizations that have project ideas are encouraged to contact American Rivers to discuss potential projects prior to submitting an application.

\$ Range: Up to \$25,000

Schedule: American Rivers conducts a project solicitation and competitive selection process twice annually. Grant Applications are due in November 2005.

42. NOAA/Fish America Partnership

Contact: Jim Turek, (401) 782-3338 or James.G.Turek@noaa.gov

Summary: NOAA partners with The Nature Conservancy (TNC) to fund marine and anadromous fish habitat restoration projects *around the coastal U.S. The applicant must be a TNC local chapter.* Organizations that have project ideas should contact their local TNC chapter to discuss forming a partnership to apply for project funds under this request for proposals.

Eligibility: The applicant must be a local TNC Chapter and projects must be linked to a TNC priority conservation area as identified in TNC's ecoregional planning process or identified as a high priority by the state or territorial TNC chapter.

\$ Range: \$25,000 - \$85,000

Schedule: Grant Applications are due in March.

43. NOAA/The Nature Conservancy Partnership

Contact: Jim Turek, (401) 782-3338 or James.G.Turek@noaa.gov

Rob Brumbaugh,

Summary: NOAA partners with The Nature Conservancy (TNC) to fund marine and anadromous fish habitat restoration projects *around the coastal U.S. The applicant must be a TNC local chapter.* Organizations that have project ideas should contact their local TNC chapter to discuss forming a partnership to apply for project funds under this request for proposals.

Eligibility: The applicant must be a local TNC Chapter and projects must be linked to a TNC priority conservation area as identified in TNC's ecoregional planning process or identified as a high priority by the state or territorial TNC chapter.

\$ Range: \$25,000 - \$85,000

Schedule: Grant Applications are due in March.

44. NOAA Community-based Restoration Program Individual Project Grants

The CRP provides funds for individual grass-roots marine habitat restoration projects that will benefit living marine resources including anadromous fish species, commercial and recreational resources, and endangered and threatened species. Proposals undergo a competitive review, and projects are selected based on their technical merit, level of community involvement, ecological benefits to marine and anadromous fish habitat, and coast-effectiveness. During open announcements, applications are directed to the NOAA Restoration Center.

Next anticipated deadline September 14, 2005

45. NOAA Community-based Habitat Restoration National and Regional Partnership Grants

Partnerships are a key element in community efforts to accomplish significant, on-the-ground habitat restoration. Partnerships established under the Community-based Restoration Program in 2001 have helped NOAA amplify financial resources and reach a larger, more diverse array of communities with strong vested interests in fishery habitat restoration. Partnerships have significantly leveraged available NOAA funds through cash match and local contributions, including land, volunteer support, and other in-kind services such as technical assistance, earthmoving activities and local knowledge. NOAA Restoration Center regional staff take an active role in partnership projects as needed, providing one-on-one technical and permitting assistance in restoring habitats required by marine and anadromous fish, endangered species, and other living marine resources. Restoring and protecting natural resources would be greatly limited without the advantages of partnerships.

Next anticipated deadline June 2006

46. NOAA Direct Solicitation

Contact: Jim Turek, (401) 782-3338 or James.G.Turek@noaa.gov

\$ Range: Up to \$300,000/project

47. NRCS-Conservation Reserve Program (CRP)

The Conservation Reserve Program reduces soil erosion, protects the Nation's ability to produce food and fiber, reduces sedimentation in streams and lakes, improves water quality, establishes wildlife habitat, and enhances forest and wetland resources. It encourages farmers to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover, such as tame or native grasses, wildlife plantings, trees, filter-strips, or riparian buffers. Farmers receive an annual rental payment for the term of the multi-year contract. Cost sharing is provided to establish the vegetative cover practices. For additional information contact the USDA Natural Resources Conservation Service office serving your county.

48. NRCS-Emergency Watershed Program (EWP)

The purpose of the Emergency Watershed Protection program is to undertake emergency measures, including the purchase of flood plain easements, for runoff retardation and soil erosion prevention to safeguard lives and property from floods, drought, and the products of erosion on any watershed whenever fire, flood or any other natural occurrence is causing or has caused a sudden impairment of the watershed. It is not necessary for a national emergency to be declared for an area to be eligible for assistance. The program objective is to assist sponsors and individuals in implementing emergency measures to relieve imminent hazards to life and property created by a natural disaster. Activities include providing financial and technical assistance to remove debris from streams, protect destabilized streambanks, establish cover on critically eroding lands, repairing conservation practices, and the purchase of flood plain easements. The program is designed for installation of recovery measures. For additional information contact the USDA Natural Resources Conservation Service office serving your county.

49. NRCS-Environmental Quality Incentives Program (EQIP)

The Environmental Quality Incentives Program provides technical, educational, and financial assistance to eligible farmers and ranchers to address soil, water, and related natural resource concerns on their lands in an environmentally beneficial and cost-effective manner. The program provides assistance to farmers and ranchers in complying with Federal, State, and tribal environmental laws, and encourages environmental enhancement. The program is funded through the Commodity Credit Corporation. The purposes of the program are achieved through the implementation of a conservation plan which includes structural, vegetative, and land management practices on eligible land. Five- to ten year contracts are made with eligible producers. Cost-share payments may be made to implement one or more eligible structural or vegetative practices, such as animal waste management facilities, terraces, filter strips, tree planting, and permanent wildlife habitat. Incentive payments can be made to implement one or more land management practices, such as nutrient management, pest management, and grazing land management. Fifty percent of the funding available for the program will be targeted at natural resource concerns relating to livestock production. The program is carried-out primarily in priority areas that may be watersheds, regions, or multi-state areas, and for significant statewide natural resource concerns that are outside of geographic priority areas. For additional information contact the USDA Natural Resources Conservation Service office serving your county.

50. NRCS-Flood Risk Reduction Program (FRR)

The Flood Risk Reduction Program was established to allow farmers who voluntarily enter into contracts to receive payments on lands with high flood potential. In return, participants agree to forego certain USDA program benefits. These contract payments provide incentives to move farming operations from frequently flooded land. For additional information contact the USDA Natural Resources Conservation Service office serving your county.

51. NRCS- Forest Land Enhancement Program (FLEP)

The Forest Land Enhancement Program (FLEP) is part of Title VIII of the 2002 Farm Bill. FLEP replaces the Stewardship Incentives Program (SIP) and the Forestry Incentives Program (FIP). FLEP is optional in each State and is a voluntary program for non-industrial private forest (NIPF) landowners. It provides for technical, educational, and cost-share assistance to promote sustainability of the NIPF forests. FLEP is designed to benefit the environment while meeting future demands for wood products. Eligible practices are tree planting, timber stand improvement, site preparation for natural regeneration, and other related activities. Interested landowners can contact any consulting forester or Steve Anderson (Forest Stewardship Program) at 413-256-1201 or steve.anderson@state.ma.us.

52. NRCS-Resource Conservation & Development Program (RC&D)

The purpose of the Resource Conservation and Development (RC&D) program is to accelerate the conservation, development and utilization of natural resources, improve the general level of economic activity, and to enhance the environment and standard of living in authorized RC&D areas. It improves the capability of State, tribal and local units of government and local nonprofit organizations in rural areas to plan, develop and carry out programs for resource conservation and development. The program also establishes or improves coordination systems in rural areas. Current program objectives focus on improvement of quality of life achieved through natural resources conservation and community development which leads to sustainable communities, prudent use (development), and the management and conservation of natural resources. Authorized RC&D areas are locally sponsored areas designated by the Secretary of Agriculture for RC&D technical and financial assistance program funds. NRCS can provide grants for land conservation, water management, community development, and environmental needs in authorized RC&D areas. For additional information contact the USDA Natural Resources Conservation Service office serving your county.

53. NRCS-Watershed Operations --Small Watershed Program and Flood Prevention Program (WF 08 or P03)

The Small Watershed Program works through local government sponsors and helps participants solve natural resource and related economic problems on a watershed basis. Projects include watershed protection, flood prevention, erosion and sediment control, water supply, water quality, fish and wildlife habitat enhancement, wetlands creation and restoration, and public recreation in watersheds of 250,000 or fewer acres. Both technical and financial assistance is available. For additional information contact the USDA Natural Resources Conservation Service office serving your county.

54. NRCS-Watershed Surveys and Planning

The purpose of the program is to assist Federal, State, and local agencies and tribal governments to protect watersheds from damage caused by erosion, floodwater, and sediment and to conserve and develop water and land resources. Resource concerns addressed by the program include water quality, opportunities for water conservation, wetland and water storage capacity, agricultural drought problems, rural development, municipal and industrial water needs, upstream flood damages, and water needs for fish, wildlife, and forest-based industries. Types of surveys and plans include watershed plans, river basin surveys and studies, flood hazard analyses, and flood plain management assistance. The focus of these plans is to identify solutions that use land treatment and nonstructural measures to solve resource problems. For additional information contact the USDA Natural Resources Conservation Service office serving your county.

55. NRCS-Wetlands Reserve Program (WRP)

The Wetlands Reserve Program is a voluntary program to restore wetlands. Participating landowners can establish conservation easements of either permanent or 30-year duration, or can enter into restoration cost-share agreements where no easement is involved. In exchange for establishing a permanent easement, the landowner receives payment up to the agricultural value of the land and 100 percent of the restoration costs for restoring the wetlands. The 30-year easement payment is 75 percent of what would be provided for a permanent easement on the same site and 75 percent of the restoration cost. The voluntary agreements are for a minimum 10-year duration and provide for 75 percent of the cost of restoring the involved wetlands. Easements and restoration cost-share agreements establish wetland protection and restoration as the primary land use for the duration of the easement or agreement. In all instances, landowners continue to control access to their land. For additional information contact the USDA Natural Resources Conservation Service office serving your county.

56. NRCS-Wildlife Habitat Incentives Program (WHIP)

Contact: Toby Alexander

Schedule: Applications are due in October 2005 for FY 2006.

Summary: The Wildlife Habitat Incentives Program provides financial incentives to develop habitat for fish and wildlife on private lands. Participants agree to implement a wildlife habitat development plan and USDA agrees to provide cost-share assistance for the initial implementation of wildlife habitat development practices. For example, cost-sharing for fish passage structures may be available from the WHIP in addition to habitat improvements such as invasive plant control, streambank stabilization and water cooling. USDA and program participants enter into a cost-share agreement for wildlife habitat development. This agreement generally lasts a minimum of 10 years from the date that the contract is signed. For additional information contact the USDA Natural Resources Conservation Service office serving your county.

57. Research and Demonstration Grant Program

Contact: Arthur Screpetis (617) 767-2875, e-mail: arthur.screpetis@state.ma.us

Summary: This grant program enables the MDEP to conduct a program of study and research and demonstration relating to water pollution control and other scientific and engineering studies” so as to insure cleaner waters in the coastal waters, rivers, streams, lakes and ponds of the Commonwealth.”

Eligibility: Unsolicited proposals may be submitted at any time to the MDEP, by any interested Massachusetts public or private organization.

Schedule: Unsolicited proposals are accepted anytime. Call for more information.

58. Trout Unlimited Embrace-A-Stream Grants

Contact: Rob Roberts (406)543-1192 rroberts@tu.org

Greg Ponte (207) 724-2861

Summary: NOAA partners with Trout Unlimited (TU) to fund coastal projects around the U.S. that benefit anadromous fish submitted to TU’s Embrace-A-Stream program. The applicant must be a TU local chapter. Organizations that have project ideas should contact their local TU chapter to discuss forming a partnership to apply for project funds under this RFP. <http://www.tu.org/index.asp>

\$ Range: \$10,000

Schedule: Proposals due December 20, 2004

59. USFWS – Funding for Fish Passage

Contact: Jan Rowan, CT River Coordinator

Summary: The Fish Passage Program is a voluntary, non-regulatory program that provides assistance to work with partners to remove or bypass barriers to fish movement. Types of project assistance include providing information on habitat needs and methods for fish to bypass barriers, and technical engineering support for reviewing project designs and recommending the most cost-effective techniques.

\$ Range: \$75,000 - \$150,000 (no match required, but 50% match is encouraged)

Schedule: Applications are accepted continuously, and proposals are held in a FWS database until funded or no longer viable.

60. USFWS – Partners for Fish and Wildlife

Contact: Chris Smith, (802)872-0629 (ext. 20). – VT
Eric Derleth (603)223-2541 (ext. 14) – MA, NH
Ron Joseph (207)827-5938 – ME

Summary: The Partners for Fish and Wildlife Program provides technical and financial assistance to private landowners for habitat restoration on their lands. A variety of habitats can be restored to benefit Federal trust species (for example, migratory birds and fish and threatened and endangered species.) Normally the cost share is 50 percent (the Service and the landowner each pay half of the project costs), but the percentage is flexible. Services or labor can qualify for cost-sharing.

Eligibility: Any privately-owned land is potentially eligible for restoration. "Privately-owned", for the purposes of this Program, generally means lands not owned by a State or the Federal government.

\$ Range: usually \$5,000 - \$10,000 (maximum award is \$25,000)

Schedule: Applications are accepted continuously.

61. Watershed Project Financing and Construction

Contact: Central Regional Contact:

Gustav Swanquist (617) 556-1083, e-mail: gustav.swanquist@state.ma.us or
Paul Anderson (508) 792-7692, e-mail: paul.anderson@state.ma.us

Western Regional Contact:

Stanley Linda (617) 292-5736, e-mail: stanley.linda@state.ma.us or
Deirdre Cabral (413) 784-1100 x2148, e-mail: deirdre.cabral@state.ma.us

Summary: State Revolving Loan Program.

Eligibility: Massachusetts municipalities and wastewater districts.

Match: Loans are subsidized, currently at 50% grant equivalency. (Approximately a no-interest loan.)

\$ Range: In recent years the program has operated at an annual capacity of \$150 to \$200 million per year, representing the financing of 40-50 projects annually.

Examples: Project / Design / Construction of municipal water pollution abatement activities, including wastewater treatment facilities, correction of combined sewer overflows, wastewater collection and transmission facilities, nonpoint source projects (including Title 5), and infiltration/inflow removal. Design and construction of projects to protect or improve public drinking water systems, including filtration, disinfection, and distribution.

Schedule: Calendar Year Basis; applications due October 15.

62. Massachusetts Department of Fish & Game, Public Access Board

Contact(s): John P. Sheppard, Director
Doug H. Cameron, Assistant Director/Deputy Chief Engineer
Anthony Stella, P.E.
Terrance W. Smith, P.E.

Address: 1440 Soldiers Field Rd., Brighton, MA 02135-1021

Telephone: (617) 727-1843

Website: http://www.mass.gov/dfwele/pab/pab_toc.htm

Summary: The Public Access Board (PAB), the smallest of the three agencies in the Massachusetts Department of Fish & Game, is charged with the responsibility of helping people who use boats, canoes, kayaks, and other watercraft gain access to all of Massachusetts' public waterways. To date, the agency has overseen the design and construction of more than 250 facilities, including boat ramps, canoe and cartop access sites, sport fishing piers, and shore fishing areas.

The Board works with state and federal agencies, cities, and towns to improve fishing and boating opportunities on equal terms for the public.

In addition to the construction of access sites, PAB also provides engineering, construction, and technical services to the other agencies in the Department and Environmental Law Enforcement.

Eligibility: Public Access Board staff review requests for boat launching and fishing facilities and conducts site investigations to determine the feasibility of developing new access sites. The minimum criteria that must be met for the Board to consider a proposed facility are as follows:

- the proposed project must be on a publicly owned water body
- there must be a demonstrated recreational need for the project
- the project must be consistent with the mission of the Department of Fish and Game
- personnel must be available to assist with the general upkeep of the facility
- the topography must be appropriate for development of a boat or canoe launching facility. If no development is contemplated, the land must be suitable for foot passage to the shoreline.

Match: No match required

\$ Range: The timing of said design, construction; repairs, reconstruction shall be dependent upon budget restrictions and the appropriation of adequate funds by the Massachusetts legislature.

Examples: Within the Chicopee River Watershed area, PAB facilities currently include canoe and cartop access sites on the Ware River in Rutland, Barre, and Hardwick; fisherman access sites on Quabbin Reservoir, Quaboag Pond, South Pond in Brookfield, Lake Wickaboag in West Brookfield, Harwick Pond in Hardwick, the Swift River in Belchertown, Red Bridge Landing in Wilbraham, and Haviland Pond in Ludlow, and a sport fishing pier and walkways on Springfield Reservoir in Ludlow. In 2005, PAB signed a Land Management Agreement with the Town of Ware for construction of a new fisherman access on the Ware River.

Schedule: Requests are accepted continuously.

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EOEA. 2003. Chicopee River – A comprehensive watershed assessment 2003.

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Gomez and Sullivan Engineers. 2003. Overview of water use and transfer in the Chicopee River basin: Final Report, September 2003. Prepared for Massachusetts Department of Environmental Management – Office of Water Resources.

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MDEP. 2002. Total maximum daily loads of phosphorous for selected Chicopee Basin lakes. DEP, DWM TMDL Report MA36025-2002-2. January 2002.

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MDFW, and NHESP. 2003. Living waters: guiding the protection of freshwater biodiversity Massachusetts.

MWRA. 2002. Water System Supply and Demand, May 2002

PVPC. 2004. Chicopee River watershed basin assessment 1999-04/604. August 2000 – June 2002.

Appendices

Appendix A - List of Contacts

Name	Affiliation
Bob Grenier	4B Development Corp
Paul Varney, Sr.	Barre Mobile Home Park
Earl Sample	Barre Water Department
Timothy Lofland	Belchertown Water District
Nancy Mason	Bond Construction Corp.
Robert Flagg	Bondsville Water District
Greg McKinstry	Brookfield Meadows
Bruce Clark	Brookfield Water Department
Marion Summers	Camp Laurel Wood
Joseph Fahey	Camp Wind in the Pines
Bill Scanlan	Central MA Regional Planning Comm.
Michael Garvey	Chicopee River Watershed Council
Michael Toomey	Citizens For A Clean Environment (C-FACE)
Robert Craver	Citizens For A Clean Environment (C-FACE)
Edwin Waszkelewicz	Coldspring Golf Course, Inc.
Roland Janbergs	Concerned Citizens Association of Thompson Pond
Kim Lutz	Connecticut River Program Director
Andrea Donlon	Connecticut River Watershed Council, Inc.
Mark Blanchard	Conservation Commission- Oakham
	Conservation Commission- Ware
Paul Dumanoski	Conservation Commission-Barre
	Conservation Commission-Belchertown
Wilfred Steadman	Conservation Commission-Brookfield
Randall Noble	Conservation Commission-Hardwick
Allen Olly	Conservation Commission-Hubbardston
Angela Tierney	Conservation Commission-Ludlow
Glenn Colburn	Conservation Commission-Monson
Ronald Gray	Conservation Commission-N. Brookfield
	Conservation Commission-New Braintree
Dave Johnson	Conservation Commission-Palmer
Bob Clark	Conservation Commission-Petersham
Karin Leonard	Conservation Commission-Rutland
Lory Hayes	Conservation Commission-Shutesbury
Frank Postma	Conservation Commission-Spencer
Gordon DeWolf	Conservation Commission-W. Brookfield
Chris Long	Conservation Commission-W. Brookfield
Ken Lacey	Conservation Commission-Warren
Charles Smith	Conservation Commission-Wendell
Ron Cloutier	Conservation Commission-Salem
Edward Stawarz	Dauphinais & Son, Inc.
Karen Cullen	Development & Inspectional Services
Robert Allen	E.Brookfield Water Dept.
Judith Jones	East Quabbin Land Trust
John Deline	Fitchburg Water Dept.
Kimberly MacPhee	Franklin Regional Council of Governments
Kenneth Piazzo	Hardwick Knitted Fabrics, Inc.

Name	Affiliation
	Hardwick Water Pollution Control Facility
John O'Keefe	Harvard Forest
Karl Nauman	Heritage Village
John Frizzell	High View Campground
Albert Collings	Lake Wickaboag Association
Heidi Roddis	MA Audubon Society
Paul Lyons	MA Depart of Conservation and Recreation
Gene Brunelle	MA Department of Environmental Protection
Duane LeVangie	MA Department of Environmental Protection
Bob McCollum	MA Department of Environmental Protection
Warren Kimball	MA Department of Environmental Protection
Alice Rojko	MA Department of Environmental Protection
Ollie Peirce	MA Dept of Conservation and Recreation
Russ Cohen	MA Dept of Fish, Wildlife and Env Law Enforcement
Dave Armstrong	MA District Office - USGS
Ken Simmons	MA Division of Fisheries & Wildlife
Ralph Taylor	MA Division of Fisheries and Wildlife
Bill Davis	MA Division of Fisheries and Wildlife
Todd Richards	MA Division of Fisheries and Wildlife
Caleb Slater	MA Division of Fisheries and Wildlife
Vandana Rao	MA Executive Office Env. Affairs
John Clarkeson	MA Executive Office of Environmental Affairs
Carrie Banks	MA Riverways Program
Len Cawley	MA Water Resources Authority
Pam Heidell	MA Water Resources Authority
Michael Hornbrook	MA Water Resources Authority
John Gregoire	MA Water Resources Authority
Arthur Maskell	Madden Estates
Mike Gildesgame	Massachusetts Department of Conservation and Recre
Tom Spiro	Massachusetts Watershed Coalition
James Hahn	McLaughlin State Trout Hatchery
Craig Jalbert	Monson Water & Sewer
Laila Michaud	Montachusett Regional Planning Commission
Dan Laroche	Mount Grace Land Conservation Trust
Stephen Jones	N.Brookfield Water Department
Thomas Collett	Nanatomqua Mobile Home Park
Jamie Foresberg	National Park Service, North Atlantic Region
Chloe Stuart	Natural Heritage & Endangered Species Program
Earle McDonald	New England District US Army Corps of Engineers, M
Sue Ellen Johnson	New England Small Farm Institute
Jennifer Ohop	Norcross Wildlife Sanctuary
Jack Sheppard	PAB (Public Access Board)
Michael Marcinieć	Palmer Planning Board
James Ammann	Palmer Water District
Chris Curtis	Pioneer Valley Planning Commission
Douglas Albertson	Planning Board- Belchertown
Paul Anderson	Planning Board-Barre
Mary (Trudy) O'Connell	Planning Board-Brookfield

Name	Affiliation
Jeff Schaff	Planning Board-Hardwick
Vincent Ritchie	Planning Board-Hubbardston
William Bates	Planning Board-Ludlow
Craig Sweitzer	Planning Board-Monson
Mary Walter	Planning Board-N. Brookfield
	Planning Board-New Braintree
Phil Warbasse	Planning Board-Oakham
Jean Bubon	Planning Board-Palmer
	Planning Board-Petersham
Norman Anderson	Planning Board-Rutland
Patricia Zak	Planning Board-Salem
Deacon Bonnar	Planning Board-Shutesbury
Robert Ceppi	Planning Board-Spencer
Bob Lipovsky	Planning Board-W. Brookfield
	Planning Board-Ware
William Ramsey	Planning Board-Warren
Deidre Cabral	Planning Board-Wendell
Bruce Sherer	Planning Commission-Orange
William Barton	Spencer State Forest
Warren Ramsey	Spencer Water Department
Fabio Carrera	Spencer-Planning Board
Robert Gray	Sportsman's Pond Association, Inc.
Joseph Superneau	Springfield Water and Sewer Comm.
Paul Forster	St. Joseph's Abbey
Frank Rivers	Sugden Reservoir Association
Ed	The Massachusetts Watershed Coalition
Alice Bowden	The Nature Conservancy
	The Nature Conservancy (Massachusetts Field Office)
Robert Flagg	Thorndike Water District
John Sasur, Jr.	Three Rivers Fire District
	Town of Hardwick
Alec MacLeod	Town of Orange Conservation Commission
Jackie Allain	Trustees of Reservations
Chris Ward	Trustees of Reservations
Dick O'Brien	Trustees of Reservations
Steve Funderburk	U.S. Fish and Wildlife Service
Don Rich	Upper Ware Watershed Team Leader
Nancy Grantham	US EPA (Region 1)
Mike Bartlett	US Fish and Wildlife Service
Ronald Marchessault	W. Brookfield Water Dept.
Colleen Abrams	Wachusetts Greenways
Robert Allen	Wagon Wheel Co-op. Group
Sandra Gillis	Ware Fiber Recovery Assoc.
Gilbert St. George-Sorel	Ware Water Department
John O'Neill, Jr.	Warren Water District
Lexi	Water Supply Citizens Advisory Committee
Albert Lalashius	West Warren District
LeeAnne Connolly	

Name	Affiliation
Malcolm Spencer	

Appendix B - Chicopee WAP Steering Committee

Name	Affiliation
Paul Lyons	MA Dept of Conservation and Recreation
Warren Kimball	MA Dept of Environmental Protection
Pam Heidell	MA Water Resources Authority
John Gregoire	MA Water Resources Authority
Caleb Slater	MA Division of Fisheries and Wildlife
Carrie Banks	MA Riverways
John Deline	Deputy Commissioner, Fitchburg Water Supply
Doug Albertson	Town Planner, Belchertown
Gordon DeWolf	Conservation Comm, West Brookfield
John Sasur Jr	Water Super, Three Rivers Fire District
Roland Janbergs	Concerned Citizens Association of Thompson Pond
Fabio Carrera	Planning Board, Spencer
Karen Cullen	Director, Development & Inspectional Services, Spencer
Al Collings	Lake Wickaboag Preservation Association
Mike Toomey	Citizens For A Clean Environment (C-FACE)
Sue Ellen Johnson	Small Farm Institute
Randall Noble	Hardwick Conservation Commission

Appendix C - Overview of Water Use and Transfer in the Chicopee River Basin:
Executive Summary ([Gomez and Sullivan, 2003](#))

Introduction

This study was funded by the Executive Office of Environmental Affairs (EOEA), through the Massachusetts Watershed Initiative and managed by the Massachusetts Department of Environmental Management (MDEM), now the Massachusetts Department of Conservation and Recreation (MDCR) to evaluate seasonal water movement and use within the Chicopee River basin.

Located in central Massachusetts, the Chicopee River basin is surrounded by the Connecticut, Millers, Nashua, Blackstone, French, and Quinebaug River basins. The Chicopee River basin drains approximately 722 mi² and is comprised of three major watersheds—the Swift River, Ware River, and Quaboag River watersheds. Quabbin Reservoir, located in the Swift River watershed of the Chicopee, is one of the largest reservoirs constructed for public water supply in the world. It is the primary water supply source for most of the cities and towns near metropolitan Boston. The resulting wastewater is treated and discharged into Boston Harbor, many miles from its original source. The Chicopee River basin also contains several dams and is the site of many other withdrawals and diversions. Interbasin transfers and diversions can cause major reductions in streamflow.

The objective of this study was to evaluate streamflows, precipitation, water withdrawals, wastewater discharges, and interbasin water transfers to quantify and describe water movement within the Chicopee River basin. Emphasis was placed on evaluating 2001 water data, since water supply reports and other water reports were readily available for that period. A large component of this study also included the development of an interactive Geographic Information System (GIS), which catalogued the data collected as part of the study.

Summary of Key Study Findings and Results

Swift River Watershed

Water users withdrew approximately 80,771 million gallons (MG) in 2001 within the Swift River watershed. This accounted for 91.5 percent of the total water withdrawn from the Chicopee River basin. Water withdrawal and transfer patterns in the Swift River watershed are generally controlled by the Massachusetts Water Resources Authority (MWRA). The MWRA withdrawals accounted for approximately 79,119 MG (217 MGD) or 98 percent of the total water withdrawn from the Swift River watershed. The McLaughlin State Fish Hatchery was second accounting for 1,518 MG (4.2 MGD) or 1.9 percent of the total water withdrawn, while the Belchertown 40 MG (0.11 MGD) and Bondsville 94 MG (0.26 MGD) water districts combined for less than 1 percent. Water withdrawals made by the MWRA account for a significant portion of the water withdrawn not only from the Swift River watershed but the entire Chicopee River basin.

In 2001, all the water withdrawn by the MWRA was transferred out of the Chicopee River basin. This water was transferred either through the Quabbin Aqueduct (78 percent of total) to provide metropolitan Boston with drinking water, or through the Chicopee Valley Aqueduct (22 percent of total) to the Connecticut River basin to provide water for the towns of South Hadley, Wilbraham, and Chicopee. Peak water transfers for both aqueducts occurred during the late summer and fall months.

Bondsville Water District transferred 44.6 MG (0.12 MGD) of its total withdrawals from the Swift River watershed to the Thorndike Water District located within the Ware River watershed in 2001. This

monthly transfer of water was similar throughout the year with quantities ranging from 2.9 MG (0.11 MGD) in February to 4.6 MG (0.15 MGD) in July.

As part of the MWRA operations in 2001, 4,112 MG (11.3 MGD) was transferred from the Ware River watershed to the Quabbin Reservoir (Swift River watershed) during the month of April to supplement withdrawals from the Chicopee Valley and Quabbin Aqueducts.

In 2001, Belchertown Water District pumped just under 64.5 MG (0.18 MGD) from the Connecticut River basin to the Swift River watershed.

Streamflows in the Swift River watershed have been affected the most by water withdrawals and interbasin transfers. The amount of water transferred from the Swift River watershed during 2001 was substantially greater than the streamflow volume measured in the Swift River for every month, except April. The diversion of this water from Quabbin Reservoir results in alterations to the timing and magnitude of flows within the Swift River watershed.

MWRA is required to release a minimum flow of 20 MGD (32 cfs) from Quabbin Reservoir to the Swift River. The beneficial effect of providing this water from storage was evident during October and November of 2001, when precipitation totals in the Chicopee basin were well below normal. During those months, flows on the Ware and Quaboag Rivers were well below normal as well. However, during this period flows on the Swift River were near normal levels due to the minimum flow release from storage.

Ware River Watershed

A total of seven registered water users withdrew approximately 6,303 MG (17.3 MGD) of water from the Ware River watershed in 2001, which accounted for 7.1 percent of the water withdrawn from the Chicopee River basin. Water withdrawn by the MWRA totaled 4,112 MG (11.3 MGD) and accounted for 65 percent of the water withdrawn from the Ware River watershed. This large withdrawal only occurred during the month of April, when water was transferred to the Quabbin Reservoir (Swift River watershed). Water withdrawals by Fitchburg Water Department totaled 1,341 MG (3.7 MGD) or 21.3 percent of the total. The remaining five water users withdrew 850 MG (2.3 MGD) and accounted for the remaining 13.5 percent. Peak water demand occurred during August and September, and the lowest demand was in January.

All of the water (1,341 MG) withdrawn by Fitchburg Water Department is transferred to the Nashua River basin. Peak demand generally occurred from August through December with just over 71 percent of the water being transferred during these months.

As mentioned previously, the MWRA transferred water (4,112 MG) from the Ware River to the Quabbin Reservoir (Swift River watershed) and the Thorndike Water District (Ware River watershed) imported water (44.6 MG) from the Bondsville Water District (Swift River watershed). Importation of water took place throughout 2001 with the peak demand occurring during the summer months.

The Ware River watershed is impacted much less by water withdrawals and diversions compared to the Swift River watershed. However, from September to November of 2001, out-of-basin transfers were moderately high relative to average monthly streamflow in the watershed. This was partly driven by unusually low streamflow resulting from lower than normal precipitation totals.

Quaboag River Watershed

In 2001, eleven registered water users withdrew just over 1,223 MG (3.4 MGD) of water from the Quaboag River watershed, which accounted for only 1.4 percent of the total water withdrawn from the Chicopee River basin. Water withdrawn by the Spencer Water Department totaled 270 MG (0.74 MGD) and accounted for 22 percent of the water withdrawn from the Quaboag River watershed. Monson Water and Sewer was second at 191 MG (0.52 MGD) or 15.6 percent, and North Brookfield was third at 160 MG (0.44 MGD) or 13.1 percent. Peak water withdrawals occurred during May and June, while the least amount of water was withdrawn during the winter months.

Unlike the Swift and Ware River watersheds that experience transfers of water both within the basin and out of the basin, no such transfers of water occur in the Quaboag River watershed. Due to the low precipitation conditions experienced in the latter portion of 2001, in-basin water withdrawals were marginally high compared to the average monthly streamflow for August, September, and October.

Conclusions

Streamflow in the Swift River watershed has been significantly affected by water withdrawals and interbasin transfers, resulting from Quabbin Reservoir operation. In 2001, the out-of-basin transfers of 217 MGD from Quabbin Reservoir were substantially greater than the streamflow volume measured in the Swift River. This diversion of water from Quabbin Reservoir results in alterations to the timing and magnitude of flows within the Swift River watershed, which may result in adverse impacts to downstream aquatic biota. Alterations in flow are particularly evident during the typical spring high flow period, when flows are drastically reduced in the Swift River because of flood skimming and water storage operations at Quabbin.

MWRA is required to release a minimum flow of 20 MGD (32 cfs) from Quabbin Reservoir to the Swift River. This flow release has beneficial effects such as maintaining Swift River flows, during the late summer/early fall of 2001, near normal regulated levels at times of extended low precipitation. At the Ware and Quaboag Rivers, which do not benefit from summer/fall flow augmentation, streamflows are directly tied to the prevailing precipitation levels, and as a result were much lower than historic averages during the late summer/early fall of 2001.

The Ware and Quaboag River watersheds are impacted much less by water withdrawals and diversions compared to the Swift River watershed. However, from September to November of 2001, water withdrawals were relatively high compared to average monthly streamflow in the watersheds. This was partly attributable to lower than normal precipitation levels.

It is unclear whether the interaction between water withdrawals, streamflow patterns, and water movement is consistent from year to year, since the evaluation of water withdrawals within this study was focused on the year 2001, which experienced below normal annual precipitation levels. A longer study period would have been representative of more typical hydrologic conditions.

A definitive analysis of consumptive water use within the Chicopee River basin was not fully evaluated, since the study contained only a cursory review of NPDES wastewater discharges, as the study scope did not allow for an exhaustive data collection and evaluation effort.

Study Recommendations

The following recommendations to improve management of water movement and use are based on the conclusions of this study.

- Evaluate alternative schedules for minimum flow releases from Quabbin Reservoir to the Swift River to mimic natural flow patterns to the greatest extent possible. The operation of Quabbin Reservoir significantly alters the timing and magnitude of streamflow in the Swift River. It may be possible to minimize the potential impact of these water withdrawals on downstream aquatic biota through alternative reservoir management practices.
- Future investigations should encompass a five year evaluation period of the interaction between water withdrawals, streamflow patterns, and the corresponding movement of water within the Chicopee basin. The evaluation of water withdrawals within this study was focused on the year 2001, which represented atypically dry hydrologic conditions. A longer study period would be more representative of average hydrologic conditions.
- Future investigations should include a more detailed inflow/outflow analysis to assess monthly water balances within each watershed. The study examined water withdrawal volumes in detail; however, limitations in the scope did not allow for an in-depth analysis of consumptive water use in the Chicopee basin.
- The interactive Geographic Information System (GIS) should be updated periodically with new data as it becomes available. A significant portion of this study included the development of an interactive GIS, which contained the data collected as part of this study. It is envisioned that the GIS will assist those, who manage the water resources within the Chicopee River basin, as well as those who wish to understand water movement and use in the basin.

Appendix D - Chicopee River Watershed Basin Assessment 1999-04/604
Executive Summary ([PVPC, 2004](#))

Introduction

The Pioneer Valley Planning Commission conducted a sub-basin assessment of stormwater infrastructure, existing water quality data, and local stormwater regulations for the lower Chicopee River watershed. The study area consisted of those portions of Ludlow, Wilbraham, Springfield, and Chicopee within the watershed. The purpose of the project is to provide watershed stakeholders with a comprehensive picture of current stormwater management techniques within the project area and, to assist the municipalities in meeting the Environmental Protection Agency's (EPA) National Pollutant Discharge Elimination System (NPDES) Phase II Minimum Control Measures. Hence, the intended users of this report and its products are largely municipal staff, but also the interested public. A glossary of terms used throughout the report can be found in the Appendix.

Each section of the report describes the data collection methodology, an assessment of the information, and recommendations. Recommendations that directly apply to the NPDES Phase II Minimum Control Measures are noted as such. It is the intention of this report that these recommendations can be pulled from the report and inserted into the municipalities Stormwater Management Plan that will be submitted to the EPA by March of 2003.

Task A: Identification and Mapping of Stormwater Infrastructure

Assessment of Mapping

Working with the Department of Public Works in the Cities of Chicopee and Springfield and the Towns of Ludlow and Wilbraham, the PVPC identified and mapped stormwater infrastructure in the Chicopee River watershed. Stormwater infrastructure mapping includes storm drains, catch basins, outfalls, and structural best management practices (BMPs) as defined in the Massachusetts Nonpoint Source Pollution Control Manual. Data sources were compiled in a Geographic Information System (GIS) using several methodologies including in-the-field GPS data collection, converting CAD drawings into ArcInfo coverages, on-screen digitizing in ArcView, and overlaying of GIS coverages and shapefiles from other sources. These methodologies are described Section 2.

Recommendations

- Train DPW field crews in the basics of GIS mapping and GPS data collection so that they are capable of collecting and inputting new information from field data collection.
- Continue to develop the stormwater maps and database to include such information as size of drain pipes, depth of drain lines, direction of flow, depth of catchbasin sumps, size of outfalls, construction materials, maintenance logs, and any other information that will provide a comprehensive program for stormwater infrastructure management.
- Conduct dry weather illicit discharge detection monitoring at mapped outfall locations to meet NPDES Phase H requirements.
- Expand GIS stormwater mapping to entire municipal stormwater system.
- Delineate and map stormsheds for each outfall.

Task B: Identification, Mapping, Assessment, and Organization of Stormwater Best Management Practices (BMPs)

Assessment of BMPs

The PVPC identified, mapped and assessed stormwater Best Management Practices, installed within the last fifteen years to reduce the impact of stormwater on the municipal infrastructure and reduce the negative impact of stormwater conveyance throughout the watershed. Local DPWs, Planning Boards and Conservation Commissions were contacted to determine type and location of BMPs. BMP assessment included 53 dry weather visual observations using a field data collection sheet developed in conjunction with DEP and mapping with GPS. Of the BMPs documented, 19 received qualitative wet weather visual assessments to determine if the BMPs were “working.” The wet weather assessments are representative of the types of BMPs observed, the land use and density surrounding the BMPs, the age of the BMPs, and the topography surrounding the BMPs.

Recommendations

- Develop operation and maintenance plans for BMPs.
- Dredge catchbasins semi-annually.
- Educate the public about the importance of stormwater management.
- Encourage stormdrain stenciling programs.
- Use native plants, adapted to site conditions and soils, to encourage establishment of thriving plant communities for nutrient uptake and sediment collection in BMPs.
- Encourage the use of constructed BMPs as attractive landscape features.
- Require four-foot minimum catchbasin sump depths.

Task C: Creation of a database of existing water quality monitoring data and flow data within the study area

Assessment of Data Collected

The PVPC inventoried past and present water quality monitoring efforts, identified data gaps, and organized the information collected into an easy to use Access database. An assessment of known water quality data is provided in Section 4. A data summary is provided in three tables. The first table (Table 11) is divided by the four segments of the main stem of the Chicopee River. The second table (Table 12) provides a data summary for the tributaries, lakes and ponds within the project area, divided by municipality. The third table (Table 13) provides a numerical list of the 87 data sources. The numerical identification for each data source in Table 13 corresponds to the “data source” column in Tables 11 and 12.

Recommendations

- Collect baseline water quality data for the main stem of the Chicopee River.
- Collect bacteria data during dry and wet weather monitoring to evaluate the effectiveness of Springfield’s and Chicopee’s CSO abatement projects.
- Collect baseline data for tributaries.
- Sample stormwater outfalls.
- Update the water quality database as new information becomes available.
- Study the effects of the hydropower dams on streamflow and habitat conditions in the Chicopee River.

Task D: Review and Inventory of Local Stormwater Bylaws and Ordinances

Assessment of Local Regulations

Section 5 presents an assessment of existing water quality protection bylaws and ordinances to examine what types of regulatory tools are being used at the local level for management of stormwater. Draft model stormwater management bylaws for addressing NPDES Phase II are included in the Appendices.

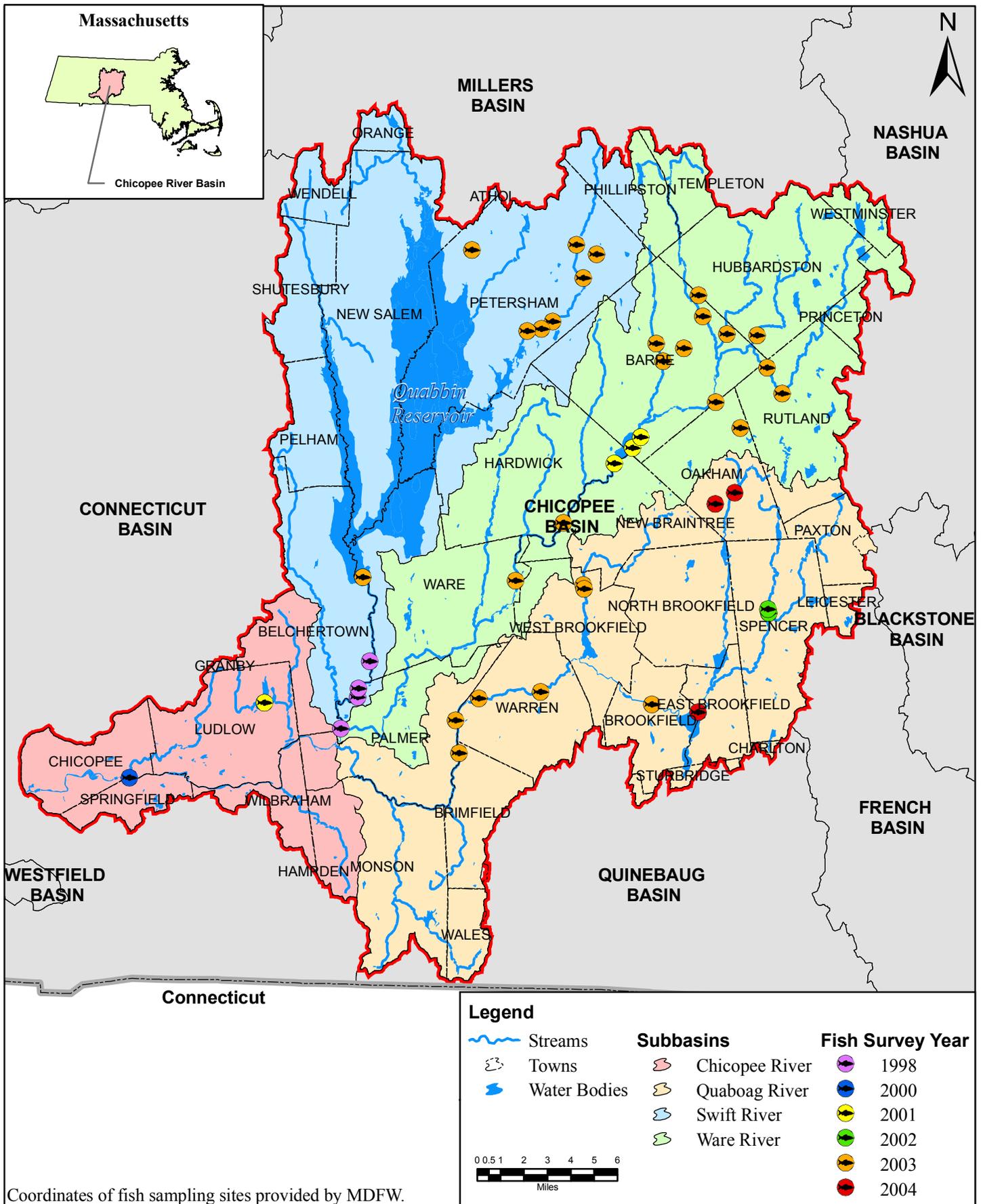
Recommendations

- Implement local regulations to address NPDES Phase II Minimum Control Measures for Illicit Discharge Detection and Elimination, Construction Site Stormwater Runoff Control, and Post-construction Stormwater Management.
- Require long-term maintenance plans for stormwater BMPs.
- Educate the public about the importance of managing stormwater through local regulations.
- Implement specific recommendations identified for each community.

Task E: Technology Transfer

To assure the utility of this project and its products, four project presentations will be made, by the contract expiration date, at local meetings of watershed stakeholders. The first meeting held on October 4, 2000 was a kickoff meeting with representatives from each of the municipalities, the Chicopee Watershed Team, DEP, and PVPC. The second meeting will be held at the May meeting of the Chicopee River Watershed Team, the third meeting in Chicopee for municipal staff in Chicopee and Springfield, and the fourth meeting in Wilbraham for municipal staff in Wilbraham and Ludlow. The last three public meetings had not been held at the time this report was completed.

Appendix E. Location of MDFW Fish Sampling Sites within the Chicopee River Basin.



Appendix F – 2005 Fish Count Data Showing the Number of Anadromous Fish Species that Passed Upstream of the Holyoke Dam on the Connecticut River as of June 30th

Species	Count
American Shad	116,255
Atlantic Salmon	128
Atlantic Salmon Released	14
Blueback Herring	534
Gizzard Shad	114
Sea Lamprey	28,134
Striped Bass	183

Appendix G – Fact Sheets Regarding MDEP’s SMART Sampling Program
(Source: Personal Communication, Warren Kimball, DEP, to Alex Levy, Gomez and Sullivan Engineers,
June 13, 2005)

SMART MONITORING

“SMART” is the acronym for Strategic Monitoring and Assessment for River basin Teams. This program was specifically designed for the Massachusetts Watershed Initiative and for the empowerment of the wide audience of involved participants referred to as “stakeholders”. The program is being piloted in 6 (six) basins in DEP’s Central Region through the cooperative efforts of the Division of Watershed Management, the Wall Experiment Station, the Nashua River Watershed Association and DEP’s Central Regional Office.

As the name implies, the program has a monitoring strategy, and assessment tool and guidance for team monitoring roles:

1. Monitoring Strategy – SMART consists of three coordinated monitoring networks:
 - A. Statewide – a small group of strategic stations that provide a yearly snapshot of statewide water quality. This information is used to evaluate trends, calculate loadings, and provide information on natural variability necessary to develop ecoregion-based water quality standards.
 - B. Rotating Basin – a dense network of stations on the 5-year basin cycle provides basin-planning information for the issuance of NPDES permits. It also provides a status report on the major rivers and, where necessary, modeling and loading information for TMDL’s.
 - C. Local – volunteer monitors are used to extend the reach of Statewide and Rotating Basin monitoring programs to tributaries and headwater streams previously unsampled. These streams comprise 75% of the river miles in the state and are the areas most vulnerable to the impacts of nonpoint source pollutants.
2. Assessment Tool – a SMART report card is prepared for each river based on the monitoring information. The purpose of the report card is to make the information available and understandable to the stakeholders. Raw data for each stream in the basin is compiled under 8 subjects:
 1. Biology
 2. Water Quality
 3. Sediment Quality
 4. Habitat
 5. Water Quantity
 6. Recreation
 7. Aesthetics
 8. Fish Edibility

Each subject is color coded under a pass/fail system summarizing the available data. The report card encapsulates available information in one or two pages, and points out gaps in information for future planning.

Volunteer Monitoring Roles – SMART customizes monitoring roles based on interest and expertise. State and federal monitoring roles are fairly well defined in the Statewide and Rotating Basin programs, but the involvement of other stakeholders constantly present new opportunities for effective partnerships. The most exciting challenge has been developing the role of volunteer monitors. SMART uses volunteers to screen unsampled areas for more intensive sampling during Year Two of the 5-year cycle. Volunteers can also work directly with DEP’s regional office on local “hot spots” that fall outside of the

5-year cycle. Data collection emphasizes low level biological monitoring for screening, habitat monitoring for nonpoint source impacts and bacterial sampling for “hot spots”. The indicators are allowed to vary with the volunteer’s interests and abilities but are aimed at filling in information gaps identified by the report cards.

Implementation- Monitoring sites for the Statewide Program were selected with the following strategic values:

- a. Clean water sites to provide reference distributions for ecoregion analysis and site - specific program and policy development;
- b. Historically impacted sites downstream of major facilities;
- c. Watershed boundary sites that could be used to calculate loadings of pollutants leaving one watershed and entering another.

A total of twenty nine sites in six Watersheds were selected for the pilot program. Sampling of the Nashua and Chicopee River Basins began in 1998. The Millers, Blackstone, Concord and Thames River Basins were added in subsequent years.

Chicopee Facts:

GOALS	1.Document baseline water quality 2.Estimate loadings at key locations 3.Define long term trends in water quality 4.Assess attainment of water quality standards 5.Provide data for other programs	
STRATEGY	A few strategic stations are sampled bimonthly throughout the five-year cycle to provide reference distributions, trends, seasonal information, and loadings. This provides continual temporal coverage in a basin. Year two sampling then adds the spatial density necessary for a comprehensive program.	
PARAMETRIC COVERAGE	Water Quality: Dissolved Oxygen PH Conductivity Alkalinity Hardness Chlorides Total Phosphorus Ammonia Nitrate Total Nitrogen Microtox Toxicity*	Habitat: Temperature Total Suspended Solids Turbidity Flow* Aesthetics
SAMPLING STATIONS	1.Seven Mile River,@ USGS gage, Cooney rd. Spencer 2.Quaboag River, @ USGS gage, Rte. 67, Brimfield 3.Ware River, @ USGS gage, Gibbs Crossing, Ware 4.Swift River,@ USGS gage, off River Rd., Ware 5.Ware River, @ USGS gage, at Intake Works, Barre	

* These parameters are not always available

Over the years, Lake Wickaboag Preservation Association (LWPA) has been educating all of us who live around the lake in ways we can help maintain the water quality of Lake Wickaboag through newsletters and our annual meeting. This brochure is a compilation of information designed to be used as a quick and easy reference guide to lake friendly living.

What are best management practices and why are they important?

Best management practices (BMPs) are simple, concrete steps you can take in your home and yard to protect the lake. Since what we do on land directly affects the water quality of the lake via ground water and stormwater runoff, we can all make a difference by learning and doing what it takes in our own homes and on our own property to maintain a healthy lake.

The information contained in this brochure has been compiled from a variety of resources including the North American Lake Management Society (NALMS). The information in this brochure is to be used as a reference guide for lake friendly waterfront living.

Lake Wickaboag Preservation Association

P.O. Box 609
West Brookfield, MA 01585

Lake Wickaboag Preservation Association

* * * * *

Best Management Practices

A guide for anyone living within 300' of the lake's shore to help protect the water quality of Lake Wickaboag.

* * * * *

Best Management Practices

Household Tips

*Conserve water

- install low-flow shower heads, water-flow regulators on faucets, and water-saver toilets
- fix any leaks

*Avoid using strong household cleaners such as drain cleaners

*Evaluate the cleaning products and detergents, etc. used in your home

-phosphate/phosphorous free are best

-dishwasher soap is an issue *(Palmolive Gel has the lowest phosphorous content of commercially available brands per Great Sand Lakes Task Force, June 1999.)*

*Reduce household hazardous waste

*Don't allow any type of drainage such as "grey water" into the lake

*Keep gutters and downspouts clean, and divert drainage away from the lake

Lawn and Garden Care

*Create a vegetative buffer along

shoreline *(See LWPA's Vegetative Buffer Brochure.)*

-leave a 10' wide unmowed/unmaintained strip and make this strip a "fertilizer-free" zone

*Don't throw grass clippings, yard waste, or leaves in the lake

-compost yard waste and/or consider a mulching lawn mower

*Set lawn mower to leave grass 2-3" high

*Landscape with native, drought resistant shrubs and ground cover

*Use appropriate nutrient for what you are growing

*Construct paths with curves and porous surfaces

*Reduce herbicides

Lawn Fertilizing

*Test your soil so you only add the nutrients you need— use phosphorous free fertilizer and slow release nitrogen

*Apply during the appropriate season

*Fill fertilizer spreaders on hard surfaces to clean up spills easily— never wash spills into storm drains

*Avoid using fertilizer on slopes

*Lightly water after applying

Manage Your Shoreline

*Control shoreline erosion— terrace steep banks and plant bankings with native vegetation

*Use natural stone to protect shoreline

Maintain Your Septic

*Pump regularly and have it inspected every few years

*Limit the use of toxic chemicals

*Avoid using a garbage disposal

*Avoid chemicals that advertise 'less frequent pumping necessary'

*Conserve water

*Don't do all your laundry on one day

Miscellaneous

*Avoid or be extremely careful with gasoline, oil, pesticides, paint, and other toxic materials in your home or yard

*Keep your boat and motor in good repair

*Don't change your car's oil near the lake

*Avoid washing your car near the lake

*Clean up pet waste

*Don't dump anything in storm drain

*Don't release aquarium or water garden plants or pets into the lake

State regulations and local laws...

The planting of native trees, shrubs, or groundcover are considered "minor" activities and generally does not require a permit under the Wetlands Protection Act. However, if you plan to use any heavy/hydraulic equipment in creating your vegetative buffer, you need to contact the Conservation Commission in town. For more information, visit www.state.ma.us/dep/brp.

For more information on vegetative buffers, please visit the following web sites...

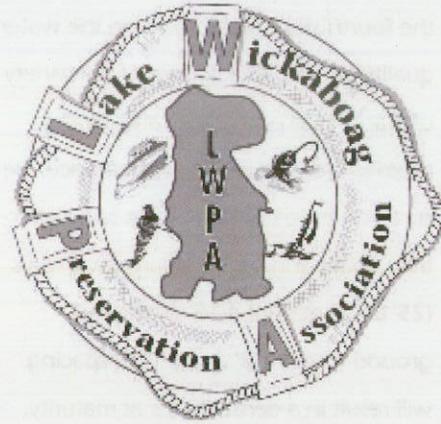
www.state.ma.us/envir/
www.state.ma.us/dfwele/river/rivfstoc.htm>
www.crjc.org/pdffiles/homeguide.pdf>
www.crjc.org/riparianbuffers.htm>
www.cwp.org
www.stormwatercenter.net
www.nhq.nrcs.usda.gov/CCS/Buffers.html>

Lake Wickaboag Preservation Association

P.O. Box 609
West Brookfield, MA 01585

www.lakewickaboagpa.tripod.com/lakewickaboag

Lake Wickaboag Preservation Association



▶ Creating and Maintaining Vegetative Buffers

Help protect the lake from excessive storm-water runoff and less than perfect ground water...create a living filter!

The information contained in this educational brochure has been compiled from a variety of sources including: Massachusetts Department Environmental Protection and the Connecticut River Joint Commission.

What is a vegetative buffer?

Simply put, a vegetative buffer is a protective buffer, or transition zone, between a water body and human activity. They are "living filters" that impede stormwater runoff and attenuate subsurface nutrients that we generate with development. A vegetative buffer, or riparian buffer, typically consists of tall/ornamental grass, shrubs, and trees along the waters edge.

Why does the water quality of Lake Wickaboag depend on vegetative buffers?

Water quality problems are a result of non-point source pollution. This pollution, a direct result of land use, occurs when rainwater, snowmelt, or irrigation runs over or filters into the land, picking up pollutants which then flow into the lake. Buffers physically filter pollutants of surface runoff by collecting trash and trapping animal waste. Buffers also filter pollutants through soil and root systems. Vegetative buffers filter and trap sediment by slowing down the velocity of stormwater runoff. Sediment is a major transporter of other pollutants including nutrients and phosphorous. These pollutants are the major contributors to algae blooms, dense weed growth, and eutrophication.*

Benefit summary of vegetative buffers...

1. Physically filters pollutants of surface runoff and ground water including nutrients from fertilizers, septic systems, and stormwater runoff
2. Allows better infiltration of water by intercepting and removing sediment runoff
3. Stabilizes eroding banks
4. Contributes to the natural aquatic food chain
5. Provides wildlife habitat
6. Provide shade and cover for aquatic life
7. Acts as a goose barrier
8. Provides privacy for landowners
9. Reduces landscape maintenance and the costs associated with landscape maintenance
10. Maintain more constant water level and temperature through groundwater recharge

**Eutrophication: abundant accumulation of nutrients that support dense growth of algae and other organisms. Eutrophication is a major factor in sediment build up which will eventually lead to the "filling-in" of the lake.*

Creating a vegetative buffer zone

A variety of trees and shrubs will do the best job of filtering runoff. The bigger the buffer, the better. However, as little as 5' of buffer will provide water quality benefits.

Step 1: Deciding the width The first step in creating a buffer is deciding its width. The factors to be considered in this step are soil type, vegetation cover, slope, and the area of impervious surfaces (e.g. driveway, rooftop, etc.) To determine the size of your buffer zone, the following guidelines may be used: based on a 1 acre lot with 100' of lake frontage:

- sandy soil - 15' wide
- silty/clay - 35' wide.

Step 2: Design The next step is designing the buffer zone. **Runoff problem** areas and **vegetation types** are the focus of this step. The best way to assess runoff problems is during a heavy rain storm; watch where the water goes. Regrading, done with stones or landscape timbers, may be necessary to divert runoff into flatter areas where it can soak into the ground. Watching the runoff may also reveal an unstable bank which should be addressed immediately. Planting ground cover or trees will help in this situation.

Step 3: What to Plant When choosing what to plant in your buffer zone, the most important factor is that the vegetation is native! A combination of trees, shrubs, and ground cover is best. Root depth should also be considered; deep and dense roots mitigate subsurface pollutants. Recommended trees include Cottonwood, Black Willow, Silver Maple, and Red Maple. Silky Dogwood, Winter Berry, Elder Berry, and High Bush Blueberry are recommended shrubs. Recommended ground covers are Foam Flower,

Goldenstar, and Wild Ginger. Please visit LWPA's web site for a more detailed list of native plants including flowers.

Step 4: Planting Planting the buffer is the fourth step toward helping the water quality of Lake Wickaboag. Use a variety of plants (size and shape) and arrange them to create a natural appearance. Be sure you have enough plants to be effective. Space shrubs 3-5' apart, small trees (25' tall at maturity) 15' apart, and ground covers 1-3' apart. This spacing will result in a dense buffer at maturity.

If you have lawn to the water's edge, you can begin a buffer by starting a wild-flower meadow. Create islands of unmowed areas and seed them with wildflowers. This option is inexpensive and easy.

Other areas to consider are your path to the water through your buffer and any runoff issues from the street into your yard. The path should be curved and graded to divert runoff into buffer areas. A vegetative buffer would also be beneficial on the street side of your

home to slow runoff from the street flowing into your yard.

Maintaining Your Buffer Zone...

***Resist the urge to tidy up! The best care is the least care when it comes to a buffer. Let the buffer grow "wild." Leave undergrowth intact.**

***Check for erosion regularly. Redirect runoff if necessary.**

***Limit the foot traffic to a curved path.**

***Replace plantings that do not survive.**

***Do not use fertilizers or pesticides in the buffer. If you must fertilize, use only lime or wood ash.**

***Pick up pet waste.**

***If you choose to mulch as the buffer "grows in," avoid cedar and redwood bark mulch because their chemistry interferes with neutralizing nutrients. Leaf humus, aged wood chips, and pine mulch are good options to help limit erosion, suppress weeds, and retain soil moisture.**

***Mow grass to a height of 2-3" and remove clippings.**

Appendix I – Stream and Lake Summary Recommendations identified in the Chicopee River Basin - 1998 Water Quality Assessment Report ([MDEP, 2001](#))

Summary - Rivers

In addition to specific issues for the individual river segments, the evaluation of current water quality conditions in the Chicopee River Basin has revealed the need for the following:

- Conduct bacteriological monitoring (use indicator organism specified in the Massachusetts Surface Water Quality Standards - SWQS) to assess the status of the *Primary* and *Secondary Contact Recreational* uses,
- implement and track the progress of combined sewer overflow (CSO) abatement activities, identify other sources of bacteria and storm water contaminants and remediate problems,
- analyze Metropolitan District Commission (MDC) and DWM benthic macroinvertebrate datasets (inclusive of the habitat quality evaluation to distinguish between habitat effects and water quality impacts) to assess *Aquatic Life Use*,
- in the next revision of the SWQS designate various rivers as Cold Water Fisheries (if supported by Division of Fisheries, Wildlife, and Environmental Law Enforcement - DFWELE) and delete CSO restrictions where no longer necessary,
- conduct monitoring to determine “natural condition” ranges for pH, dissolved oxygen, and temperature
- pursue and continue funding for resource protection efforts,
- monitor dam safety and/or removal issues including the need for fish passage facilities,
- optimize water withdrawal practices to maintain minimum streamflow, and to the extent possible, natural flow regimes,
- collect additional data to determine the frequency, duration, and spatial extent of low flow conditions and simultaneously evaluate instream temperature and dissolved oxygen concentrations, and assess habitat quality as it is related to streamflow conditions,
- implement Best Management Practices (BMPs) to reduce the impacts of storm water runoff,
- when the DEP Drinking Water Program SWAP evaluations are completed, review them, and develop and implement recommendations to protect the Class A rivers in the Chicopee River Basin,
- continue to evaluate compliance with Water Management Act (WMA) registration and permit limits, and
- reissue the remaining municipal, industrial and institutional NPDES permits in the Chicopee River Basin with appropriate permit limits and monitoring requirements.

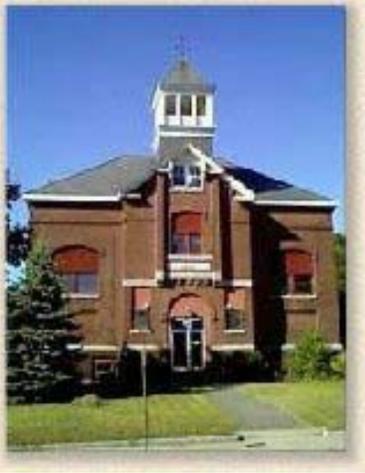
The municipal NPDES permits will address phosphorus loading to the watershed in an attempt to reduce nutrient loading to the Red Bridge Impoundment of the Chicopee River and Quaboag Pond. The need to control phosphorus loads will be refined during the next NPDES permitting cycle (2005-2006). Construction projects to abate some CSO discharges into the Chicopee River are scheduled to begin in 2001 in Palmer, Chicopee, and Ludlow. Further abatement of CSO discharges into the Chicopee River is currently in the planning stage via development of CSO Long Term Control Plans in Chicopee and Springfield and a Comprehensive Wastewater Management Plan in Ludlow. Additionally, several communities including Chicopee, Ludlow, Paxton, Springfield, and Wilbraham will be required to obtain a Phase 2 storm water permits to reduce impacts of storm water by the development of BMPs, elimination of cross-connections and significant public education.

SUMMARY - LAKES

Potentially more of the lake acreage would be listed as impaired or in a more enriched trophic status if additional variables were measured and more criteria assessed. In the Chicopee River Basin there is a need to:

- conduct monitoring for fecal coliform bacteria and Secchi disk depth to assess the *Primary Contact Recreational Use*,
- collect water chemistry data including dissolved oxygen and temperature profiles and chlorophyll *a* to assess the *Aquatic Life Use*,
- monitor and control the spread and growth of non-native aquatic and wetland vegetation,
- implement recommendations identified in the TMDLs and lake Diagnostic/Feasibility studies,
- review the DEP Drinking Water Program SWAP evaluations are when they are completed to develop and implement recommendations for the protection of Class A lakes in the Chicopee River Basin including Asnacomet, Bickford, Brigham, Brooks, Carter, Connor, Cunningham, Desmond, Doane, Edson, Gaston, Horse, Knights, Long, Lovewell, Moosehorn, Moulton, Muddy, Shaw, Stone Bridge, Thayer, Waite, and Williamsville ponds, Mare Meadow, Palmer, Quabbin (and Pottapoag Pond Basin), and Springfield reservoirs, and Queen Lake.

Appendix J – Millers River Environmental Center



The following description of the Millers River Education Center has been extracted from their website. To learn more about the development of the Education Center, please visit the following web address: <http://www.millersriver.net/index.html>

“The Millers River Environmental Center is a community resource providing a working environment for collaboration between governmental and non-governmental agencies and citizens. Integral to this mission is a strong emphasis on the education and training of area citizens to enhance their appreciation for, connection with, and stewardship of the rich natural resources of the region. Broad community participation in both the development and implementation of programs is core to the mission of the Center. Area schools and colleges, outdoor recreation and environmental groups, as well as social

service organizations are important collaborators in the educational outreach programs designed and facilitated through the Center”

“In December of 1999, the town of Athol offered the Club the use of their 1898 four-room school on Main Street if we would maintain the building and have it open to the public for educational displays and programming. During 2000, Club members and directors met with interested groups and individuals to create a plan for the use of the building. Our facilities have been improved through hundreds of hours of volunteer labor, many gifts of materials, and funding from state and local agencies and organizations. The result of these efforts is the Millers River Environmental Center: a community resource for the town and the region that provides a place for meetings, opportunities for collaboration-in particular on environmental programs, and a home for the Club.”

“Integral to our vision for the Center is an emphasis on providing opportunities for residents and visitors to enjoy, learn about, and steward rich natural resources of the region. Groups using the Center learn about our region's natural resources through the Club's exhibits that are on display. Athol and Orange, the sister towns at the core of our region, are among the ten poorest in the state, on average there are 200 homeless students attending their public schools and these two towns have very high rates of violent crime (domestic abuse). Our free and low cost programs are available to many in the region that would otherwise be unable to participate and our programs provide opportunities for positive engagement in community activities.”



OFFICE OF
PLANNING BOARD
Town Of Belchertown

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Belchertown, Massachusetts 01007
413-323-0407

Douglas Albertson, Town Planner
dalbertson@belchertown.org

Vandana Rao
Assistant Director for Water Policy
Executive Office of Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

RE: Chicopee River Watershed Action Plan

September 16, 2005

Dear Ms. Rao,

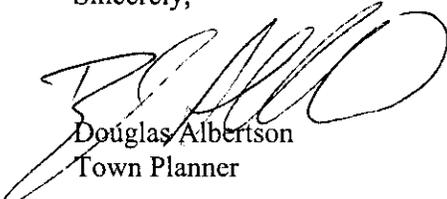
This letter is in support of the Watershed Action Plan for the Chicopee River Basin. Through several stakeholder meetings, advisory committee meetings, and reviews of the draft, this plan has been developed to remediate problems and subsequently protect the water quality, wildlife, and lifestyle within the basin.

It is clear that the issues and strategies identified in the plan are relevant and necessary. The Chicopee River basin is experiencing rapid conversion of farm and forest land to residential development. The growing population places great demands on the land by increasing storm water runoff and recreational use. The combination of increased development and decreased vegetation, especially forests, is a great threat to the quality of the water and the life it supports. It is also a direct threat to the recreation quality many of the new residents seek.

The Chicopee River basin holds several of the commonwealth's major drinking water supplies, including Quabbin Reservoir. It is imperative to the great majority of Massachusetts' residents that the Watershed Action Plan for the Chicopee River Basin be adopted, implemented, and funded where possible.

The Watershed Action Plan for the Chicopee River Basin is a clear and comprehensive approach to managing the watershed. I am pleased to have had the opportunity to participate in this plan and am eager to assist in developing policies to implement it.

Sincerely,



Douglas Albertson
Town Planner



Mitt Romney
Governor

Kerry Healey
Lt. Governor

Stephen R. Pritchard
Secretary

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